DECEMBER, 1959 • 35¢

AMERICAN

Cinematographer

SERVING ALL FIELDS OF MOTION PICTURE PRODUCTION

The Magazine of Motion Picture Photography

FEATURES IN THIS ISSUE

Motion Picture Set Lighting • Shooting "—30—" On A Single Set • New Sync-signal Method of Tape Recording • Miniature Set For A Monster

On the set for "Death Valley Days," DuPont Technical Representative Jack DuVall (right center) discusses "Superior" 2 film with director George Blair (left), Brydon Baker (left, center), and Jack Willoughby, camera operator (right).

"WHEN A WIDE RANGE FILM IS VITAL... CHOOSE DU PONT 'SUPERIOR' 2"

That's the advice of Brydon Baker, Director of Photography for McGowan Productions, producers of the popular TV series, "Death Valley Days." Mr. Baker says: "DuPont Type 936 Superior® 2 motion picture film gives me consistently good shots on set or location, in all kinds of lighting conditions."

He reports that the sponsors of "Death Valley Days," the United States Borax and Chemical Corp., naturally want their show to have the best possible dramatic effects. "That's why I chose the new 'Superior' 2," says Baker. "Its visual accuracy and wide range let me stop down for greater depth of focus. It helps me get the effects I want. In short, this film makes it possible to make pictures of the highest technical quality."

"Superior" 2 is just one of the fine DuPont films for every motion picture need. These films—and complete technical data on them—are available through the DuPont Photo Products sales offices below.

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AMERICAN
Cinematographer

December, 1959 • Vol. 40, No. 12

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•

ON THE COVER

READY TO ROLL camera for scene of Cornel Wilde and captor pilot Bill Hartley for Columbia Pictures "Edge of Eternity" is cinematographer Burnett Guffey, A.S.C. standing next to camera, mounted on a Chapman crane. On Guffey's right is director Don Siegel, while in foreground is script girl and Kendrick Sweet, producer, whose story of the photography of "Edge of Eternity" appears in this issue.

•*Feature Articles*

FILMING A THRILLER AT THE GRAND CANYON 738
Interesting photographic problems encountered in shooting scenes for off-beat murder mystery. By Kendrick Sweet and Herb Lightman.

THE CONTROL SIGNAL SYSTEM OF SYNCHRONOUS RECORDING 740
Tiny sync generator installed on camera produces sync-signal simultaneously with sound on quarter inch tape. By Victor James.

UPPING THE QUALITY OF SOUND TRACKS FOR TELEVISION FILMS 742
New device measures cross modulation of TV sound tracks as means of achieving optimum quality. By Kevin Seagram.

SHOOTING "—30—" ON A SINGLE SET 744
Geography of cluttered newspaper office poses unique problems for camera crew. By Darrin Scot.

MONSTERS AND MINIATURES 747
Special effects technicians build huge monster and largest miniature set ever constructed for "Gordo." By Ray Mercer, A.S.C.

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The basic professional techniques for lighting interiors for motion picture photography.

MORE ON BLACK-AND-WHITE TRAVELING MATTE PROCESS 751
Text omitted in error from author's initial article which appeared in the October issue. By Robert L. Hoult, FRPS, FBKS.

THE MITCHELL "16" 752
Seventh article in the series on Motion Picture Cameras, which describes salient features of the popular Mitchell 16mm motion picture camera.

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News briefs of industry activities and progress.

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Things that are new for makers of motion pictures.

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Where and what TV and feature film cameramen were shooting last month.

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Readers' questions answered by experts.

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A Salute to Mitchell Camera users throughout the world on the

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of

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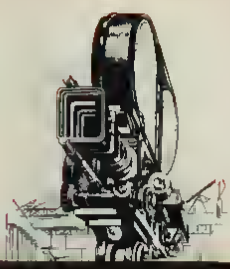

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INDUSTRY NEWS

News briefs of industry activities, products and progress

Now in preparation by the American Society of Cinematographers is one of the most complete handbooks of cinematographic data, tables and charts ever assembled. According to A S C. President Walter Strenge, complete authenticity of the data is assured by the program of exhaustive research and compilation which is preceding the data book's editing and production.

The Society, it is pointed out, is a most logical source of qualified technical information relating to motion picture photography, composed as it is of the leading cinematographers in the Hollywood motion picture industry

Title of the new pocket-size fact book is *American Cinematographer Manual* To edit the Manual, the Society has chosen Joseph V. Mascelli, a professional cinematographer and editorial contributor to *American Cinematographer* magazine. Acting as Technical Advisors and Associate Editors are Walter Strenge, A.S.C., who conducts the "Questions & Answers" column in A.C., and three-time Academy Award-winner cinematographer Arthur Miller, A S.C.

Among the outstanding features planned for the new 300-page plus Manual are a durable leatherette binding, keyed signal tabs in the index to facilitate instant locating of a needed data page, and easy-to read type composition.

Tentative publication date is May. 1960.

• • •

Processing service for 16mm Kodachrome Commercial film, Type 5268, will be discontinued by Eastman Kodak Company, effective December 1, 1959.

Early in 1958, the company discontinued processing of Type 5268 at its Rochester, Chicago, and Flushing laboratories Kodak had planned to stop processing of 5268 in Hollywood last June, but because of customers' requests, the service was extended to December Ist of this year.

Kodak stopped selling Type 5268 KC film shortly after introduction of the improved 16mm Ektachrome Commercial Film, Type 7255, early in 1958

• • •

Five minutes from Miami International Airport, 15 minutes from downtown Miami, and 25 minutes from Miami Beach, Camera Equipment Company, Inc, of New York has opened its new Florida branch at 1335 East 10th Avenue, in Hialeah

The completely stocked and fully staffed branch, known as CECO of Florida, carries a full range of professional cameras, such as 35mm and 16mm Mitchells, 16mm and 35mm Arriflex, and others. Also crab dollies, Chapman cranes, Fisher mike booms and perambulators, set lights, generators, cable, etc

A completely staffed repair and service department is maintained, eliminating need for these services to be rendered at company's New York City headquarters.

Increasing activity of professional film producers in the Florida area led to new move by CECO, according to Frank Zucker, President.

• • •

Industry Film Producers Association is now accepting for pre-screening inplant industrial motion pictures eligible for entry in the Association's 1959 IFPA Award Competition

Bronze plaques are to be awarded to the companies and certificates of merit to the individuals of the companies responsible for producing the winning films. Awards will be made at the Association's national convention, slated for March, 1960, in Los Angeles.

Only IFPA members are qualified to enter films Classifications are as follows: employee recruiting or indoctrination, technical information, public relations, training, and sales promotion. A Special Award will be given for films produced in association with an independent commercial film producer.

Entry blanks as well as membership applications are obtainable from Justin

Continued on Page 714

SEASON'S GREETINGS FROM AROUND THE WORLD

. . . IN MAGNASYNC-MAGNAPHONIC SOUND

Y TROMPETRO ANO NUEVO

SEASON'S GREETINGS

FROM DOWN UNDER

聖誕並賀
新年快樂

恭祝

HAPPY YULE SEASON

MERRY CHRISTMAS
& HAPPY NEW YEAR

سال نو مبارک

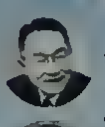
HAPPY HOLIDAYS

HOLIDAY GREETINGS

OUR BEST TO YOU AT THE HOLIDAYS

BUON NATALE
E BUON ANNO

AVEC NOS MEILLEURS VOEUX SINCERES
DE PROSPERITE POUR 1980



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- **Modular construction. Can be easily modified to process reversal film as well.**
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INDUSTRY NEWS

Continued from Page 712

Purchin, Chairman, Pre-screening Committee, IFPA, 12238 Cantura St., Studio City, Calif. Deadline for film entries is December 31, 1959.

• • •

A simple and inexpensive method of converting a standard 35mm motion picture projector to screen films for television transmission was described recently by Dr. Jasper S. Chandler of Kodak Research Laboratories at a meeting of the Society of Motion Picture and Television Engineers in New York. The method essentially changes the film pull-down sequence of the projector so it can be used with a Vidicon television storage tube.

The conversion unit costs only a fraction of the price of more complex systems, uses an eight-horsepower motor for projector power, and mounts on the side of a standard projector without special fittings.

At present the converter is used experimentally in Kodak Research Laboratories in studies of film projection for television.

• • •

Ten members of the American Society of Cinematographers, who also are members of the Academy of Motion Picture Arts and Sciences, Hollywood, have been elected to serve on various committees in preparation of the forthcoming Annual Academy Awards.

Farciot Edouart, A.S.C. is serving on Awards Policy Committee on Rules, the Scientific or Technical Awards Committee, and the Special Effects Awards Committee.

Hal Mohr, A.S.C., is serving on the Awards Program Committee, Forum and Screening Committee, and the Scientific or Technical Awards Committee. Sol Halprin, A.S.C., also is serving on the latter committee.

Linwood G. Dunn, A.S.C., Paul Eagler, A.S.C., John Fulton, A.S.C., Ub Iwerks, A.S.C., Sid Lund, A.S.C., and Clifford Stine, A.S.C.—all veteran special effects men—are serving on the Special Effects Award Committee along with fourteen other Academy members.

• • •

Acceptance of Academy invitations to join and requests for reinstatement by sixteen industry artists and craftsmen brings to 2,300 the number now on the membership rolls of the Academy of Motion Picture Arts and Sciences.

Continued on Page 771

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...MEETS YOU HALF WAY

Here in Kansas City . . . General's new Central Division . offers on-the-spot service to speed your production to the laboratory

No matter where you are . . . Industrial Center to College Town . . . or what you do . . . Educational, Religious, Industrial, Television films . . . General Film can help you.

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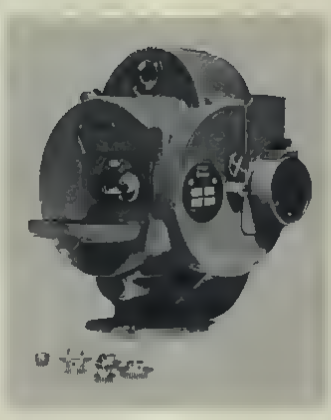


Underwater Blimp

Birns & Sawyer, 6424 Santa Monica Blvd., Hollywood 38, Calif., announce an underwater blimp designed for use with Arriflex 16mm or 35mm cameras. Said to have undergone extensive tests at depths to 300 feet, the blimp is made of welded marine aluminum girder plate with stainless steel fittings and "O" ring sealers.

The base is standard, with tops interchangeable to accommodate either the 16mm or 35mm Arriflex. Capacity is 400 feet of film. List price is $2495.00. The blimps are also available on rental or lease.

Nine-inch Telephoto

Century Photographic Equipment Co., 10659 Burbank Blvd., North Hollywood, Calif. offers a 230mm f/3.8 Tele-Athenar telephoto lens for B&H, Bolex, Eastman K-100, and Cine Special 16mm cameras. List price is $139.50.

Fototracker Camera

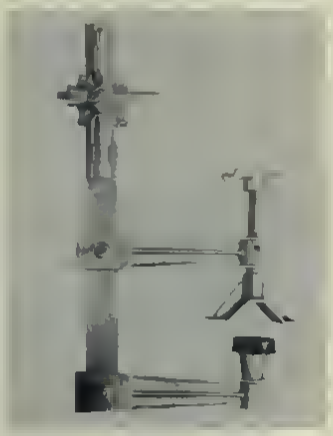
Traid Corporation, Encino, Calif., announces a newly-designed version of the 35mm B&H Eyemo camera for use in the missile field. Tradenamed the 75 Fotoracker, camera is built to rugged instrumentation standards and has externally adjustable variable shutter. A simple gear change provides speeds of 20, 40, 60, or 80 fps. Camera weighs 7 pounds, is 8" high, 6 13/16" deep and 5 3/16 wide. Uses 100-ft. daylight loading spools or 200-ft. film magazines. A wide range of accessories are available.

Modified Auricons

Television Specialty Co., Inc., 350 West 31st St., New York 1, N. Y., offers modifications of the Auricon Cine-Voice 16mm sound camera in four models and affording film capacities ranging from 100 ft. to 400-ft. Converted cameras feature built-in transistor amplifier, VU meter, monitoring jack, and microphone input. Complete weight is under 16 pounds. Separate shoulderstrap "gadget bag" contains rechargeable power pack plus storage for microphone and headset. Prices range from $1,800.00 to $2,300.00.

Grover Grip

The Grover Grip is a new idea for the support of lighting equipment in difficult areas. Essentially a carpenter's type bracket, it opens to 8 inches and will support a 10-pound weight securely on pipes, desk drawer, mouldings, room partitions or movie flats. Unit has revolving pad for attaching heavy lighting units requiring a 5/8" stud, or lighter units requiring either a 1/2" or 5/8" stud. Pad is also equipped with a 1/4-20 screw thread for mounting on tripod. Manufacturer is Natural Lighting Corp., 630 So. Flower, Burbank, Calif.



35mm Film Viewer

National Cine Equipment, 209 West 48th Street, New York 36, N. Y., announces its NCE 35mm professional film viewer that combines the functions of viewer, synchronizer, footage counter and frame counter in one unit. Projects picture 3 1/4" x 4 1/4" clear and brilliant in action or single frame. Can be used with a sound reader for single system sound films. Additional sprockets can be supplied for double-system film viewing and reading. List price is $595.00. A 16mm model is to be announced later.

Continued on Page 720

Auricon 16mm Sound-On-Film Cameras run

QUIET AS A CANDLE FLAME!

The Auricon Camera is unique, with noiseless operation as silent proof of precision design. It runs so quietly that no heavy and cumbersome external blimp (sound-proof enclosure) is required! For fast "set-up" and dependable filming of professional 16mm talking pictures, Producers and Cameramen choose Auricon to shoot pictures synchronized with Optical or Magnetic "double-system" recording equipment, or to record "single-system" sound on the same film taking the picture.

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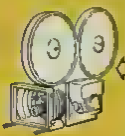

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animation, titlestand and product stage for all filmakers

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$895
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over-all length	62"	102"
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zoom range to floor	1-24 field	1 30 field

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3 – IN DIAGONAL POSITION
Columns can be locked at any angle between horiz and vert —for angular zooms or on table which is locked in horiz position

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These excellent blocks make butt splicing and repairing damaged film strips simple as A-B-C. Easy to use. No cement pleated parts and solidly constructed They are available in the following models

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Transparent—For Film

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16mm	Single Perf	$ 6.00
16mm	Double Perf	8.00
35mm		12.00

Opaque—For Magnetic Film

	per roll
16mm	$ 8.00
35mm	11.00

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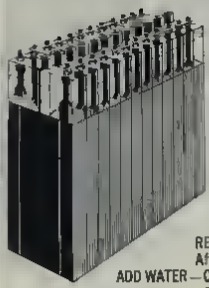

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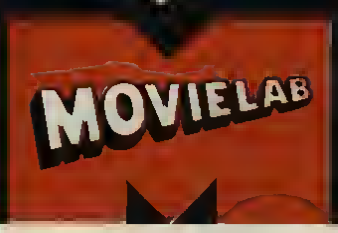

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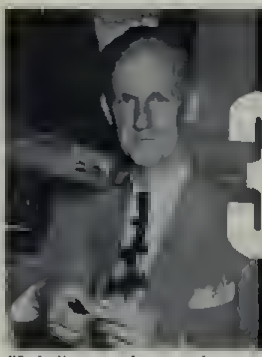

"BEN HUR" Shot with aid of

SPECTRA®

3 color meter

- The ONLY meter that measures all light sources, including daylight, accurately!
- The ONLY meter with both BLUE/RED and GREEN/RED scales plus direct reading in Spectra Index Units*!

"I shall never photograph a single scene in in ony motion picture without first consulting the SPECTRA. It has opened up complete color control for me," says

Bob Surtees ASC

Director of photography for MGM's "Ben Hur", Winner of Look and Golden Globe 1960 Awards

Surtees was able to correct for the constantly changing color temperatures of Italian sunlight only because his SPECTRA 3 Color Meter indicated precisely and rapidly the filters needed for positive color correction. Use SPECTRA to make your shots outstanding too!

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*Table is supplied to convert Spectra Index into Kelvin Units.

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WHAT'S NEW

Continued from Page 716

Animation Stand

Animation Equip. Corp., New Rochelle, N. Y., announces the Oxberry Unistand for animation, film strip and title production in small organizations. Stand is available for wall-mounting, for use on pedestal, or on a horizontal support. Write the company for detailed literature.

Kinoptik Apochromats

Karl Heitz, Inc., New York 17, N. Y., announces the complete series of Kinoptik Apochromat T-stop, high-speed lenses are now available for any 16mm or 35mm or TV cameras. List prices start at $169.00. •

Watch that WOW!

with the Gaumont-Kalee FLUTTER METER

Accurate measurement of sound equipment speed deviations

The Flutter Meter measures those components which are commonly described as "Wow" and "Flutter" resulting from speed variations in sound recorders and reproducers. This instrument is equally suitable for use with machines employing perforated film, tape, wire or disc records.

Type 1740 is of entirely new design. More compact, lighter in weight and costing considerably less than earlier Gaumont-Kalee Flutter Meters, but with the same high performance and facilities.

Brief technical data

Operating carrier frequency 3,000 c.p.s. ± 5%
Minimum input signal 50 mV R.M.S.
Input. Impedance 1 Megohm
Input amplifier bandwidth —3dB at 2,500 & 3,500 c.p.s.
Effective limiter range ± 10dB
Meter scaling—"Peak wow" 0 to ± 1% (centre zero)
"Wow" and "Flutter" 0 to 1% and 0 to 0.2% R.M.S.
Crossover frequency 20 c.p.s.
"Flutter" meter response —3dB at crossover
—3dB at 200 c.p.s.
"Wow" meter response —3dB at crossover
—1dB at 0.5 c.p.s.
C.R.O. output frequency response level down to zero frequency—3dB at 200 c.p.s.
3,000 c.p.s. oscillator output level 5V R.M.S. into 0.5 Megohm 100 mV R.M.S. into 500 ohms
Accuracy: Meter presentations ± 2% f.s.d.
Power consumption 35 watts
Operation 45 to 60 c.p.s.
Dimensions Height 10¼" 26.04 cm. Width 12¼" 31.12 cm. Depth 14¾" 36.47 cm.
Nett Weight 29 lb. 13.15 Kilos

GAUMONT-KALEE
FLUTTER METER
TYPE 1740

Important users of Gaumont-Kalee Flutter Meters include:

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2 Brand New Developments

reduce weight of Cine-Voice outfit by 1/2!

TSC is first with a completely portable . . . completely practical 16mm S.O.F. Camera Outfit. Built around the dependable mechanism of the Auricon Camera, these 2 developments REDUCE THE WEIGHT by approximately 25 POUNDS . . . make sound-on-film practical on EVERY shooting assignment.

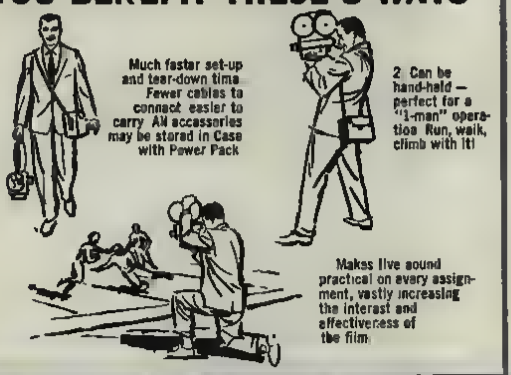
BRAND NEW!

TSC Transistorized Amplifier, built right into the base of the camera, provides better sound quality with a fraction of the weight and bulk. Sound controls and meter cluster are built into the back of the camera — convenient to the viewfinder for easy "1-man" operation.

BRAND NEW!

TSC Power Pack, using new type nickel cadmium batteries, reduces the overall weight even further. Convenient Power Pack Case provides additional storage space for microphone, cables, headset and other accessories.

YOU BENEFIT THESE 3 WAYS


Much faster set-up and tear-down time. Fewer cables to connect, easier to carry. All accessories may be stored in Case with Power Pack
2. Can be hand-held — perfect for a "1-man" operation. Run, walk, climb with it!
Makes live sound practical on every assignment, vastly increasing the interest and effectiveness of the film.

COMPLETE OUTFIT includes new Cine-Voice II Camera, TSC Transistorized Amplifier, TSC Nickel Cadmium Power Pack, Microphone, Headset, Cables, Carrying Case.

OPTIONAL EXTRAS include 400' modification, 3 lens turret, viewfinder door, lenses.

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PHOTOGRAPHIC ASSIGNMENTS

WHAT THE INDUSTRY'S CAMERAMEN WERE SHOOTING LAST MONTH

By MARION HUTCHINS

TIME OUT for a group photo was taken by cinematographer Boris Kaufman, ASC (far right), on set of "The Fugitive Kind," which he photographed in New York and which stars (from left to right) Marlon Brando, Joanne Woodward and Anna Magnani. Director is Sidney Lumet, left of Kaufman.

ALLIED ARTISTS

ELLIS CARTER, ASC, "The Purple Gang" with Barry Sullivan. Frank McDonald, director.

GEORGE FOLSEY, ASC, "I Passed for White" with Sonya Wilde and James Franciscus. Fred Wilcox, director.

LUCIEN BALLARD, ASC, "Pay or Die" with Ernest Borgnine and Zohra Lampert. Richard Wilson, director.

AMCO STUDIOS

ALAN STENSVOLD, ASC, "Police Station"* "Congressional Investigator"* (Sandy Howard Prods.) Sandy Howard, director.

GILBERT WARRENTON, ASC, Commercials*.

AMERICAN NATIONAL

WILLIAM WHITLEY, ASC, "Men into Space"* (Ziv-TV) with Bill Lundigan.

MONROE ASKINS, "Sea Hunt"* (Ziv-TV) with Lloyd Bridges.

BOB HOFFMAN, RICHARD RAWLINGS, "Bat Masterson"* (Ziv-TV) with Gene Barry.

ARTHUR FEINDEL, ASC, EDWARD CRONJAGER, ASC, MONROE ASKINS, "This Man Dawson"* (Ziv-TV) with Keith Andes.

CURT FETTERS, "Tombstone Territory"* (Ziv-TV) with Pat Conway.

RICHARD RAWLINGS, "Lockup"* (Ziv-TV) with MacDonald Carey.

CALIFORNIA STUDIOS

STUART THOMPSON, ASC, "Have Gun, Will Travel"* with Richard Boone and Kam Tong.

FLEET SOUTHCOTT, "Gunsmoke"* with James Arness and Dennis Weaver.

FRED BENTLEY, "The Lineup"* with Warner Anderson and Tom Tully.

COLUMBIA

IRVING LIPPMAN, "Manhunt"* (Screen Gems) with Victor Jory and Patrick McVey. Fred Jackman, director.

CHARLES WELBORN, "Tightrope"* (Screen Gems) with Michael Connors.

GERT ANDERSEN, ASC, "Donna Reed Show"* (Screen Gems) with Donna Reed. Oscar Rudolph, director.

FRED GATELY, ASC, "Father Knows Best"* (Screen Gems) with Robert Young and Jane Wyatt. Peter Tewksbury, director.

HENRY FREULICH, ASC, "Dennis the Menace"* (Screen Gems) with Gloria Henry & Herbert Anderson.

PHILIP TANNURA, ASC, "Man from Blackhawk"* (Screen Gems) with Robert Rockwell, "Two Faces West"* (Pilot, Screen Gems) Paul Wendkos, director.

WILKIE COOPER, "I Aim at the Stars" (Morningside Prods., shooting in Germany) with Curt Jurgens and Gia Scala. Lee Thompson, director.

DANIEL FAPP, ASC, "All the Young Men" (Hall Bartlett Prods.) with Alan Ladd and Sidney Poitier. Hall Bartlett, director.

THOMAS TUTWILER, ASC, "World Championship Golf Show"* (Screen Gems). Fred Briskin, director.

CHARLES LANG, ASC, "Strangers when we Meet" (C'Scope & Color, Richard Quine Prods.) with Kirk Douglas and Kim Novak. Richard Quine, director.

CHRIS CHALLIS, "Surprise Package" (Stanley Donen Prods., shooting in Europe) with Yul Brynner and Mitzi Gaynor.

BASIL EMMETT, "The Enemy General" (Clover Prods., shooting in Europe) with Van Johnson and Jean Pierre Aumont. George Shearman, director.

BURNETT GUFFEY, ASC, FRED GATELY, ASC, RICHARD RAWLINGS, "Alcoa-Goodyear Theatre"* (Screen Gems)

DESILU STUDIOS—Culver City

LUCIEN ANDRIOT, ASC, "U. S. Marshall"* (Desilu Prods.) with John Bromfield.

CHARLES BURKE, "Man with a Camera"* (Desilu Prods.) with Charles Bronson.

CHARLES VAN ENGER, ASC, "Betty Hutton Show"* (Desilu Prods.) with Betty Hutton. Richard Kinon, director.

HENRY CRONJAGER, "Grand Jury"* (Desilu Prods.) with Lyle Bettger and Harold Stone. Sobey Martin, director.

EDWARD FITZGERALD, ASC, "The Gale Storm Show"* (ITC Prods.) with Gale Storm and ZaSu Pitts. James Kern, director.

HASKNESS SMITH, "Pony Express"* (Desilu Prods.) Jean Yarborough, director.

DESILU STUDIOS—Gower

KENNETH PEACH, ASC, "Lassie"* (Jack Wrather Prods.) with June Lockhart and John Provost.

ROBERT PLANCK, ASC, "The Millionaire"*. James Sheldon, director.

ROBERT HAUSER, "Wyatt Earp"* (Desilu Prods.) with Hugh O'Brien.

PAUL IVANO, "The Texan"* (Desilu Prods.) with Rory Calhoun.

CHARLES STRAUMER, "The Untouchables"* (Desilu Prods.) with Robert Stack and Jerry Paris.

ROBERT PITTACK, ASC, "Ann Sothern Show"* (Desilu Prods.) with Ann Sothern.

NICK MUSURACA, ASC, "Barbara Stanwyck Theatre"* (Desilu Prods.) with Barbara Stanwyck.

DESILU STUDIOS—Hollywood

ROBERT DE GRASSE, ASC, "Danny Thomas Show"* (Desilu Prods.) with Danny Thomas, Sheldon Leonard, director. "Love and Marriage"* (Desilu Prods.) George Abbott, director.

LOTHROP WORTH, ASC, "The Real McCoy's"* (Brennan-Westgate Prods.) with Walter Brennan. Hy Averback, director.

SID HICKOX, ASC, "Red Skelton Show"* (Desilu Prods.) with Red Skelton. Seymour Berns, director.

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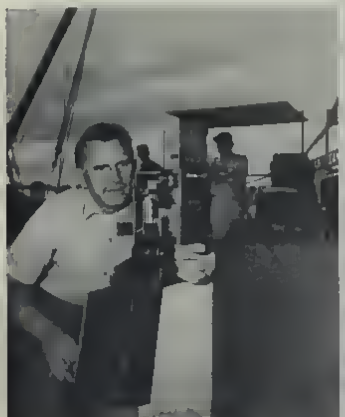
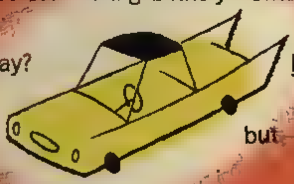


WHITE CINEMATOGRAPHER Joseph Birac ASC (photo left) was on location in Alaska filming Warner Brothers' "Ice Palace," he uncovered the first motion picture camera ever brought into Alaska and perhaps the oldest in existence outside of a museum today. Called a Chronophotographe it was made in France in 1897. In photo at right, Birac demonstrates the camera with the assistance of its present owner, Heath Ives (standing), a retired Alaskan photographer and former sourdough.

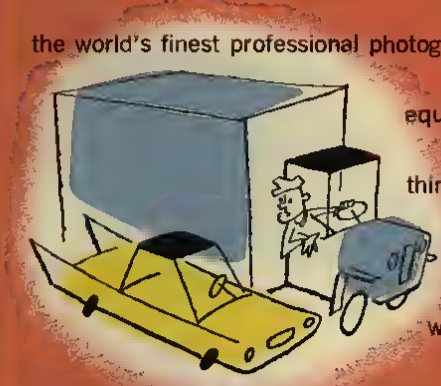
Did that car really drive itself?

Did you catch the commercial showing a driverless car driving blithely down the highway?



It looked driverless but you guessed it—it wasn't.

A director of a well known producing company had this brainstorm. Terrific, but how do you do it? Our boys worked it out for him. Actually, CECO* experts and technicians are called upon to solve many more complex problems. Think of CECO as headquarters for the world's finest professional photographic equipment—but think of us also when you're wrestling with a tough idea. Maybe we can help. Try us.



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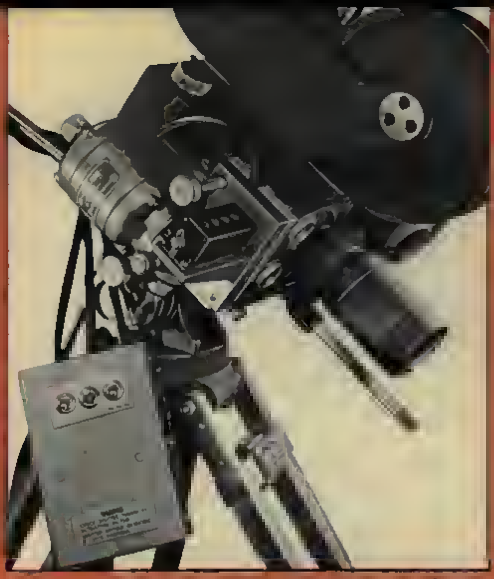


CECO Stop Motion Motor for Maurer Camera

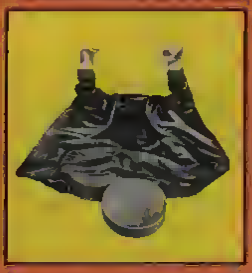
110 volt synchronous motor Can be operated single frame or continuous run on forward or reverse Exposure time ⅜ second at 170° opening ⅝ second at 235° opening Attaches directly to Models 05 and 150 Stop motion motors available for most all other cameras

CECO Professional Junior Geared Head

Used for controlled pan and tilt Smooth action Ideal for Panoram shots and tabletop photography Fits all Pro Jr. tripod bases Crank handles included

Mazell Dual Image Viewfinder Attachment

Attaches to Mitchell or CECO Erect Image Viewfinder Allows dual viewing of image scene by the cameraman and a director or account executive



CECO Double Zipper Changing Bag

Lightproof, accommodates 1000′ 35mm magazine or 1200′ 16mm magazine. 34″ x 48″ black sateen outer bag Rubber inner bag has roomy sleeves and light-tight wristlets

CECO offers the world's largest and most comprehensive line of professional cameras, accessories, lighting, editing, processing and animation equipment including MAURER Products (Exclusive Distributor), Oxberry Animation Equipment, Cooke Speed Panchro Series II, Kinetal, Kinoptic, and Bausch & Lomb Baltar Lenses Other products we carry are: Color Charts · Computers · Splicers · Exposure meters · Projectors · Screens · Marking pencils and pens · editors gloves · stop watches

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Cameras - 16mm and 35mm

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Lighting Equipment

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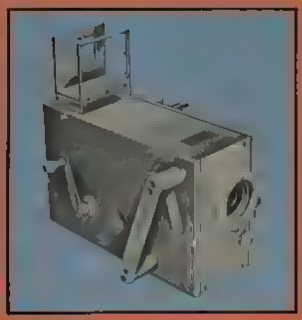
CECO Triangles—Models B & C

Adjustable and collapsible All aluminum construction Brass studs for tripod points Insures rigid positioning of tripod legs Prevents slipping and damage to floors (Model C illustrated) Model B without leg clamps



CECO Underwater Housing for Eastman Kodak K-100 16mm Camera

Withstands water pressures at 75 ft (with accessory pressure valve, down to 175 ft) All camera controls easily operated under water Viewing ports show film exposed, iris setting, spring wind Constructed of ¼" anodized dural plates Accommodates 10 mm F1.8 fixed focus Angenieux Lens

CECO Blimp for 16mm Maurer Camera

First contour model blimp for 16mm Maurer Compact, permits easy accessability to camera. Utilizes outside finder with follow-focus cam system

ARRIFLEX 35, Model II B

Mirror reflex camera with direct, through-the-lens focusing and viewing, and three-lens turret Features stronger hand grip motor to pull new 400' color magazine Portable, rugged, dependable The world's standard among cameramen.

CECO Variable Speed Motor for Maurer Camera

110 volt AC-DC operation Equipped with tachometer Motor drives camera at variable speeds from 8 to 48 FPS Attaches easily to camera by 2 screws. Available in 12 volt DC

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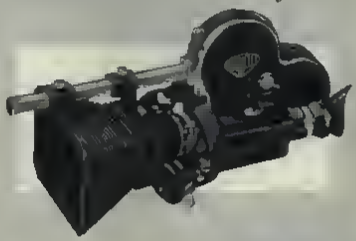
ARRIFLEX factory representatives will be delighted to meet you personally, to answer special questions in detail and to help solve technical problems.

The ARRIFLEX show is a "*must see*" show for everyone interested in modern motion picture equipment for industrial, military, educational, theatrical and television use. See schedule at right—make definite plans to be with us when the ARRIFLEX show is in your area. Check box below.

THANK YOU!



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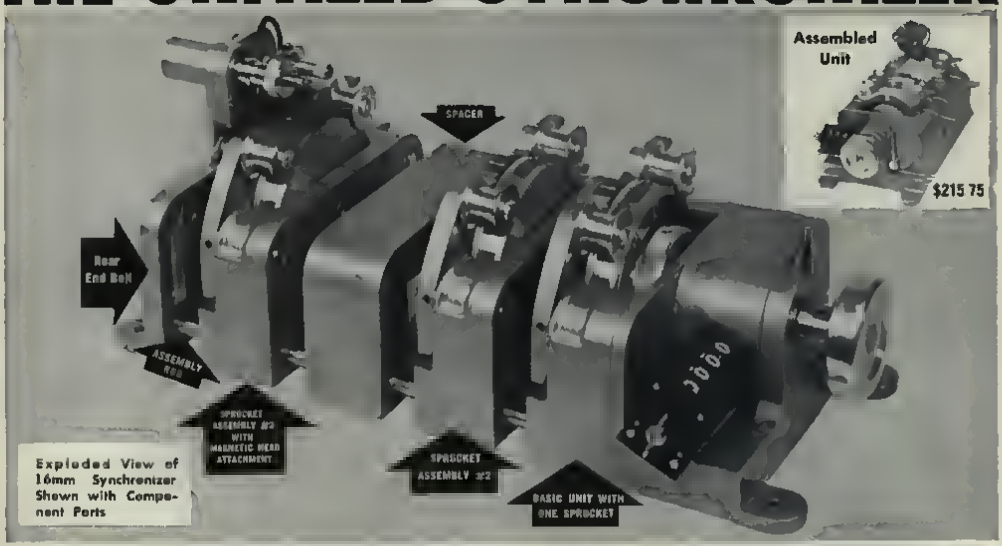

A totally new concept in film synchronizers add or subtract units as you need them, when you need them

A unitized design concept is incorporated in our entire line. You can now purchase a synchronizer and be able to add-a-unit whenever the need is there. It is not necessary to put your unit aside, because you have outgrown it, or change your mode of operation. We have developed this unitized system to give the film editor a flexible piece of precision equipment.

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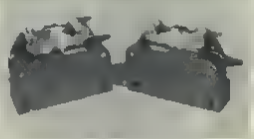
- Dural tension rollers — adjusted individually
- Finger tip release
- Perfect control — convenient hand wheel
- Individual frame movement — shaft slip lock
- Table mounting feet with rubber pads
- Attractive hammertone finish
- Simple coupling method for unitized assemblies

Look for this trademark

COMBINATION SYNCHRONIZERS are also available



$32.50

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$95.00

One gang single 16mm unit

$95.00

One gang single 35mm unit

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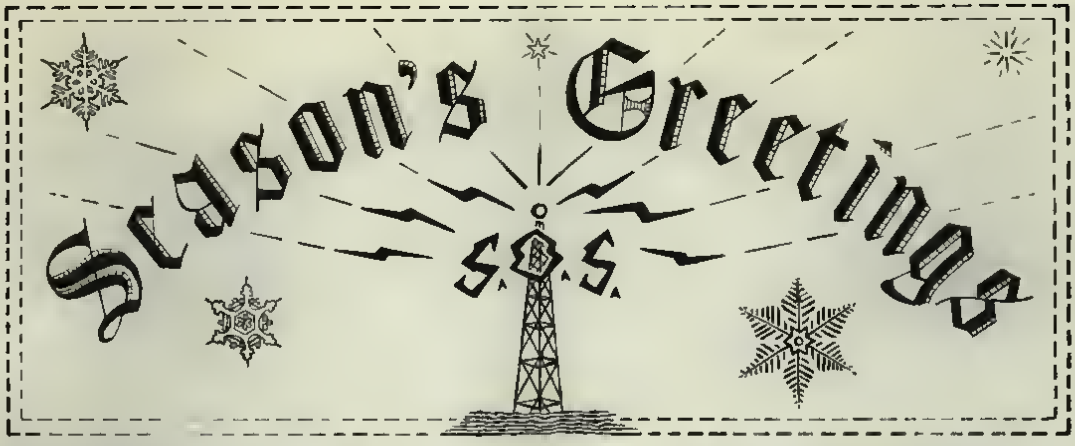

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The S O S TEL-Amatic Film Cleaning Machine is a modern JET-SPRAY cleaner for BOTH 16mm & 35mm FILM

You Cannot Damage Film with TEL Amatic

- Jet-Spray Film Wash
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- Special Non-Scratch Buffers
- Automatic Stop If Defective Splice Parts
- Requires Only 15' of Leader
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- Take-up Torque Meter, Adjustable, Reversible
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- Complete operation VISIBLE at all times
- Variable Speed DC Drive

Laboratory tests using films with the softest emulsions have shown excellent results

TEL Amatic also features silent ball timing drive, 3,000' capacity speed in excess of 10,000' per hour and fine precision workmanship. *Does more work and better than machines twice the price. One person can handle a battery of TEL Amatics—a great labor saver.*

Complete TEL-Amatic Neg/Pos Film Cleaning Machine $2950

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Cinemaphon Magnetic Striper

Automation in Magnetic Soundstriping 8/16mm Film

Now you can stripe your own film. Why send it out? CINEMAPHON SONOSTRIPER will do it in your own plant, saving time and money. Pays for itself with your first month's output. Sound reproduction conforms to highest industry standards. Striper 8/16mm film—the only professional sound striping machine under $2 000

SPEED: Stripes 1320 feet per hour.
CAPACITY 1,000'—holds approx 2,000 striping ribbon tape
WEIGHT 36 lbs —**SIZE:** 26"x13"x11" deep
OPERATES on 110/220 Volt AC, 50 or 60 cycles

In addition Sonostriper has rapid rewind footage counter, ball bearings, heated drying drum with built in thermometer. Cinemaphon requires minimum maintenance since machine is self contained

Laminates Three Slices of Magnetic Recording Tape—8mm, 16mm, 24mm Stripes 8 or 16mm double or single perforated; color or black-&-white, raw stock, positives or release prints.

Complete Cinemaphon Magnetic Striping Machine $1995

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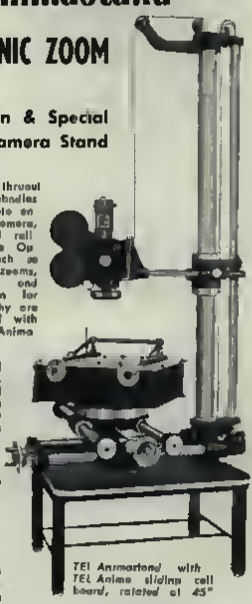

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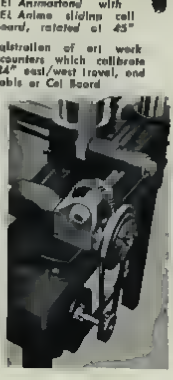

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PHOTOGRAPHIC ASSIGNMENTS

Continued from Page 724

DISNEY STUDIOS

HARRY WAXMAN, "The Swiss Family Robinson" (Panavision & Tech., Buena Vista release; shooting in B W L) with John Mills and Dorothy McGuire. Ken Annakin, director.

WILLIAM SNYDER, ASC, "John Slaughter"* with Tom Tryon and Robert Middleton.

GORDON AVIL, ASC, "Colorado River"* William Beaudine, director.

FLOYD CROSBY, ASC, "Swamp Fox"* with Leslie Nielsen and Joy Page.

ERA STUDIOS

RAY FOSTER, ASC, Commercials*.

FOX WESTERN AVENUE

JAMES VAN TREES, ASC, "The Many Loves of Dobie Gillis"* with Dwayne Hickman. Rod Amateau, director.

GENERAL SERVICE

HAROLD LIPSTEIN, ASC, "Adventures of Ozzie & Harriet"* (Stage 5 Prods.) with Ozzie, Harriet, David and Rickey Nelson, Ozzie Nelson, director.

FRANK REDMAN, ASC, "Perry Mason"* (CBS TV) with Raymond Burr and Barbara Hale

MEREDITH NICHOLSON, "Border Patrol"* (Gallu Prods.) with Richard Webb. John Peyser, director.

GOLDWYN STUDIOS

NORBERT BRODINE, ASC, EUGENE POLITO, "Loretta Young Show"* (Lewislur Prods.) with Loretta Young

INDEPENDENT

JAMES SEELEY, ASC, Missile Test Project RCA Atlantic Missile Range, Cape Canaveral, Fla.

MORRIS HARTZBAND, "Brenner"* (Kenco; shooting in N.Y.) with Ed Binns and James Broderick. Gerald Mayer and Herman Hoffman, directors.

JOHN ALTON, "Elmer Gantry" (Eastman color, Elmer Gantry Prod. for UA release) with Burt Lancaster and Jean Simmons. Richard Brooks, director

WILLIAM CLOTHIER, "Alamo" (Todd-AO; Batjac Prod. for UA; shooting in Texas) with John Wayne and Richard Widmark. John Wayne, director

FREDDIE YOUNG, "Gorgo" (Technicolor and wide screen, King Bros. Prods., shooting in London) with Bill Travers and Vincent Winter. Gene Lourie, director

FREDDIE YOUNG, "Gorgo" (Technicolor & Wide Screen, King Bros. Prods.; shooting in London) with Bill Travers and Vincent Winter. Gene Lourie, director

ERNEST LASZLO, ASC, "Inherit the Wind" (Stanley Kramer Prods. for U A release) with Spencer Tracy and Florence Eldridge. Stanley Kramer, director

MAURY GERTSMAN, ASC, "The Gangster" (Premium Pics. for UA release) with Ron Foster and Luana Patten. Edw. L. Cahn, director.

KTTV STUDIOS

JACK MARTA, "Rescue 8"* (Cinefilm Inc.) with Jim Davis and Lang Jeffries. Robert Walker, director

METRO-GOLDWYN-MAYER

JOSEPH RUTTENBERG, ASC, "The Subterraneans" (C'Scope & Color) with Leslie Caron and George Peppard. Ranald MacDougall, director

ROBERT BOONNER, ASC, "Please Don't Eat the Daisies" (C'Scope & Color) with Doris Day and David Niven. Charles Walters, director

DALE DEVERMAN, "One Step Beyond"* with John Newland.

WILLIAM MARGULIES, "Not for Hire"* (Calif. National Prods.) with Ralph Meeker. "Philip Marlaw"* (Jack Chertok Prods.) with Phil Carey.

WILLIAM SPENCER, "Fibber McGee and Molly"* (NBC-TV) with Bob Sweeney and Cathy Lewis.

TED MCCORD, ASC, "Adventures of Huckleberry Finn" (C'Scope & Metrocolor, Samuel Goldwyn, Jr. Prod.) with Tony Randall and Eddie Hodges. Michael Curtiz, director.

HAROLD WELLMAN, ASC, "Key Witness" (Avon Prod.) with Jeg Hunter and Pat Crowley. Phil Karlson, director

MILTON KRASNER, ASC, "Bells are Ringing" (C'Scope & Metrocolor; Arthur Freed Prod.) with Judy Holliday and Dean Martin. Vincente Minnelli, director

RUSSELL METTY, ASC, "The Platinum High School" (Albert Zugsmith Prod.) with Mickey Rooney and Terry Moore, Charles Haas, director.

JOHN NICHOLAUS, "Rawhide"* (CBS-TV) with Eric Fleming and Clint Eastwood.

RAY FOSTER, ASC, "Secret Service"* (Pilot), Commercials*.

GEORGE CLEMENS, ASC, "Twilight Zone"* (CBS-TV)

WILLIAM DANIELS, ASC, "All the Fine Young Cannibals" with Robert Wagner and Natalie Wood. Michael Anderson, director.

Continued on Page 765

FILMLINE ANNOUNCES

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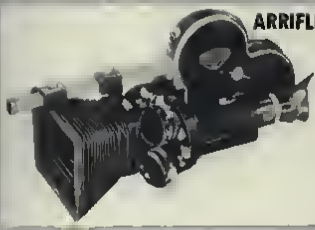

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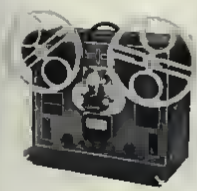

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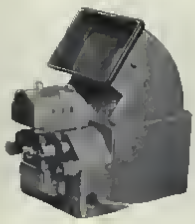

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WALTER STRENGE'S

QUESTIONS & ANSWERS

Need advice on a picture making problem? Your questions are invited and will be answered by mail. Questions and answers considered of general interest will appear in this column each month

Q We are producers of advertising and instructional motion pictures and presently are using 35mm film from which we ultimately obtain optically-reduced 16mm copies. As a general rule, these are printed on positive stock which already carries a magnetic sound stripe.

We would like to change our procedure and shoot directly on 16mm, but the laboratory that handles the processing and printing of our films has advised against it, for the following reasons:

1) They claim they cannot properly contact-print 16mm negatives to positive stock having a sound stripe as this would cause the magnetic stripe to be inverted and the print, therefore, will not pass correctly over the playback head of our projectors.

2) The laboratory further claims that it would not be advisable to reverse the negative and print through the base of the film (to enable us to retain use of the magnetic sound stripe) as they believe this would cause serious losses in light transmission and would vitally affect the quality of the release print.

We agree with the first claim but doubt very much that the second is correct. However, in view of the fact we are not technical people, we are not sure of our ground and therefore would like your professional opinion on this matter.

If the laboratory is correct in its claims, will you please let us know what procedure would be best for us to follow to enable us to print 16mm negative directly to 16mm positive film pre-striped with magnetic track? Would special printing equipment be necessary for this? The laboratory serving us has a Bell & Howell 16mm continuous printer.

The use of film with magnetic sound is vital to our business as our mobile units operate in areas where the problem of multiple language exists, and for this reason we feel very strongly about retaining this in our films.

Can you tell us also if there is available a film stock having magnetic stripe laid on the emulsion side instead of on the base side of the film?—*J. F. A, Manila, Philippines.*

Answer: You have pretty much answered all your own questions. If you intend to shoot your productions on 16mm film, we suggest you use reversal film — either color or black and-white—and have a dupe negative made from same which can then be printed on the stock you are presently using, which is striped on the base side.—*Ted Fogelman, A.S.C. Associate.*

Q I use single-perforated 16mm film in the camera and have the finished print, after editing, magnetic striped for sound by the 3M process. I believe that in general I follow the same methods used by most non-professionals in that the original Kodachrome becomes the finished print—complete with hundreds of splices.

The latter are made with a Griswold, Jr. wet splicer, which does a fine job. But I find two major objections: I get an audible "blup" when splices hit the sound head, and the film tends eventually to split at the point of splice.

I have tried the quick-splice adhesive tapes but I am unable to make a splice with this material that is not visible when projected.

What is the best splice method for my use? Can tape be applied smoothly so that it will not make the splice visible in projection? Can the 3M magnetic sound strip be applied over a tape splice?—*K. W.*

Answer: It is suggested that you avoid all the unnecessary work and expense you describe and edit your original Kodachrome, then have the laboratory make a print therefrom which will be completely free of splices. This print may then be sound-striped, eliminating all your troubles.—*Lou Vincent, A.S.C. Associate.*

Q In photographing a Chinese junk coming in towards a rocky promontory, I wish to achieve the effect of the craft coming through a fog, and becoming more clearly defined as it approaches. I have Harrison fog filters Nos. 2 and 4. Are there any special directions, filter factors, etc., to be observed in order to get the effect described? Camera to be used is an Arriflex 16; the film: daylight-type Kodachrome.—*S. A. D., Seoul, Korea.*

Answer: Fog filters alone may not give the desired effect of increasing clarity as the subject approaches, because fog filters affect both background and foreground to about the same degree

Used with real (or artificial) fog, such filters are useful to enhance the effect of the fog—especially in the foreground where real fog usually thins out. out.

Smoke, which is light in tone, may sometimes be used where artificial fog-making facilities are not available;

Continued on Page 734

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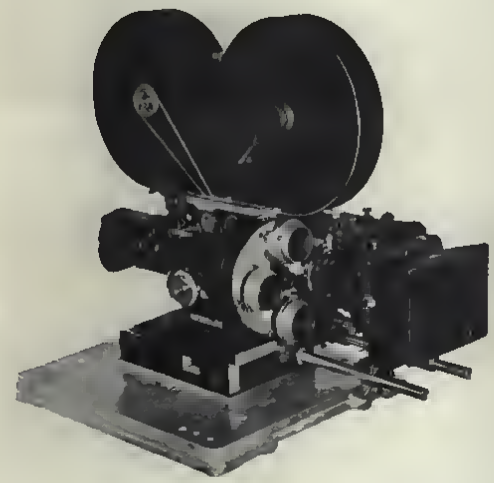

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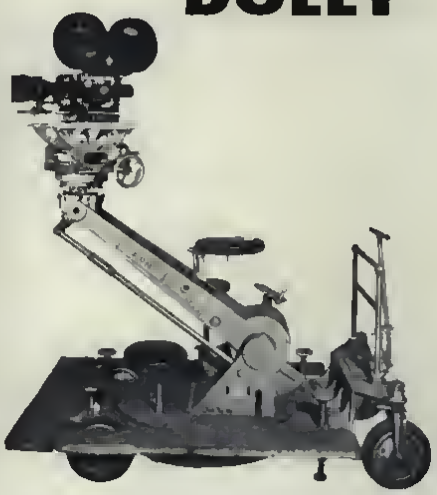

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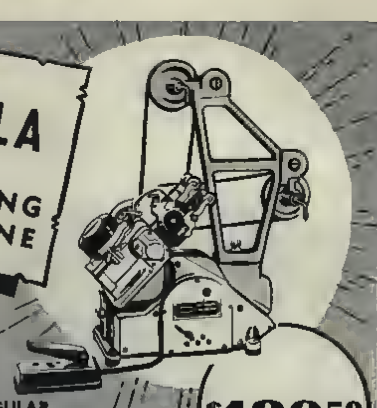

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QUESTIONS AND ANSWERS

Continued From Page 732

here fog filters can be useful in blending background with the foreground

When fog filters are used, the resultant effect is best determined through actual test where the photographer is not already familiar with it. Usually, the end result is much less "foggy" than appears to the eye through the camera, depending, of course, on the aperture used and the subject contrast.

By combining fog filters, additional effect is obtainable. In color photography, bright hues often pick up in the background, and even a fairly pale blue sky will come through on film where it was unnoticeable through the camera.

Interesting fog effects can be improvised, where time permits, by shooting through parallel glass cells into which small amounts of cigarette smoke are introduced or exhausted.

No factors need be considered for fog filters; they lighten the scene enough to make up for any transmission loss; in fact, it is sometimes necessary to stop down the lens.—*Ralph Woolsey, A.S.C.*

Q Where may I obtain a moderate-priced 16mm CinemaScope-type wide-screen lens for use on both camera and projector?—*K. I., Honolulu, Hawaii.*

Answer— Paillard, Inc., market an interchangeable anamorphic lens having a screen aspect ratio of 2-to-1 that is designed for use with the 25mm and 50mm lenses used on Bolex cameras. For use with cameras other than Bolex, a special supporting bracket is required (which some camera owners have made themselves). A similar bracket is also required for using the lens with projectors. Factory-made brackets are presently available for Bell & Howell, RCA, Kodak and Victor 16mm projectors, which retail for $28.00 each.

When planning to use this anamorphic lens with cameras other than Bolex, it should be kept in mind that the diameter of the rear element of the Bolex anamorphic, which is approximately 32mm, should be equal to the maximum aperture of the taking and projection lenses with which it is to be used —*Max Gordon, Paillard, Inc.* •

Q I am considering a prominently advertised developing tank for processing film, in which the film travels from one spool to another as it passes through the developer solution. It would seem to me that, with both spools going into the solution, a certain amount of residue developer would seep down between the layers of wound film, resulting in uneven development.

Furthermore, would not the film be unevenly developed? Also, what method is used for drying film processed with this type equipment?—*F. J. B., Sydney, Australia.*

Answer: While it is true that a certain amount of solution is retained on the film surfaces after it has passed through the developer and then wound on the take-up spool, pre-hardening and thorough rinsing after development seems to obviate the danger and insure uniform development.

Drying of films thus processed is usually done on a small reel of the "fish-line" type which probably can be purchased from the manufacturer of the developing tank — *S. Rose, Micro Record Corp.*

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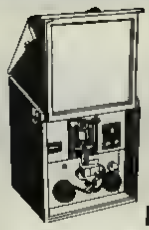

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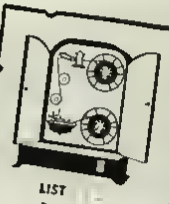

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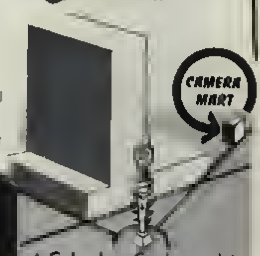

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MOUNTING THE Mitchell camera in the helicopter preparatory to making aerial shots of mid-air battle in tram car. Here 'copter's bubble has been removed to permit greater freedom for camera operator Emil Ostermon (back of camera)

ZOOMING DOWN on the action, 'copter pilot Bill Hartley enables Osterman to follow aerial fight action over Grand Canyon

Filming A Thriller At The Grand Canyon

Location filming is sometimes difficult, sometimes a lot of fun. Shooting "Edge of Eternity" at the Grand Canyon was a genuine challenge because of the unusual photographic opportunities the locale offered for an off-beat murder mystery.

By KENDRICK SWEET

As Told To Herb Lightman

"EDGE OF ETERNITY," a Thunderbird Production recently completed for Columbia Pictures' release, is a thriller with a Grand Canyon locale, and notable for some unusually spectacular photography.

The basic story idea for "Edge of Eternity" developed as a result of several flying trips I had made around Kingman, Arizona, while working on other motion pictures. Once, while flying my own plane over the Grand Canyon, I had observed the 10,000-foot cable-span and aerial tram cars utilized by the U. S. Guano Company in its operation of removing age-old bat guano from almost bottomless caves in the sheer canyon cliffs

I was also intrigued by the old ghost town of Oatman, Arizona, where most of the film, "Foxfire," had been shot. Here, Mrs. Georgia Brandenberg, one of the town's few remaining residents, told me that a number of spine-chilling murders had been committed in the area. Well, this is the stuff movies are made of, and the wheels began to click in my mind. I conceived the idea of producing a murder mystery on a grand scale against this spectacular and picturesque background.

Inquiry revealed that I could use the cable span and its tram cars, and that in Kingman there were planes and helicopters available from "Buzz" Wescott and his Kingman Flying Service And I was assured of unlimited cooperation from the local police and the Highway Patrol officers

Back in Hollywood I talked the idea over with Don Henderson—who is on the staff of the "You Asked For It" television program—who had previously shot a ten-minute film for that show in and around the guano caves I had seen from the air. We decided to go to the rim of the Grand Canyon and spend a few days shooting tests with a 16mm camera and color film. I wanted also to try out the new Panatar lenses, so we also brought along a 35mm Arriflex camera and used it alternately with the sixteen in shooting panoramic and close shots.

AS AERIAL TRAM CAR moves toward cave in canyon wall (background), life and death struggle enacted in car is photographed from helicopter circled at right. Second craft (circled left) plays role in picture as it carries deputy to scene.

When prints of the 35mm footage, blown-up to Todd-AO widescreen format, were projected later in the Michael Todd projection room in Hollywood, I was enthusiastic about the superb quality and steadiness of image, despite the fact the Arriflex shots were made hand-held. It was then the decision was made to film "Edge of Eternity" in CinemaScope.

I next conferred with script writers Ted Markson and Knut Swenson on the story idea and together we wrote an original screenplay designed to utilize all the unique physical elements of the Grand Canyon locale: the aerial tramway, the scenic but eerie ghost town of Oatman, the treacherous "roller coaster" Gold Road leading into it, and the stark, atmospheric town of Kingman, etc. From previous experience we knew what was involved in flying a plane through the Grand Canyon and landing it on the "floor." In short, we knew exactly what we had to work with, what we could and could not do, so were careful not to put in the script anything that could not be worked out once we were on location.

The result was the screenplay for "Edge of Eternity." The story concerns the solving of three brutal murders, which have occurred in and around the Grand Canyon, by a local deputy sheriff, portrayed by Cornel Wilde, who is assisted by his girl friend, played by Victoria Shaw. Climactic highlight of the story is the fight-to-the-death between Wilde and the murder-suspect in a wildly swinging aerial tram car suspended on a cable 4,000 feet above the canyon floor.

Search for a capable "action" director to bring all this to life on the screen led to Don Siegel, whose feature film credits include "Crime In The Streets," "Riot In Cell Block 11," and "Baby Face Nelson." (Siegel also became associate producer of the film.)

Two ace Hollywood cinematographers were signed to photograph the picture. Burnett Guffey, A.S.C., (two-time Academy Award winner for black-

Continued on Page 765

NOT A MINIATURE, but an actual automobile was sent hurtling over Grand Canyon edge for scene for "Edge of Eternity."

SAFETY ROPE is tied to camera assistant Larry Butler and operator Emil Osterman as safeguard is shooting auto plunge scenes.

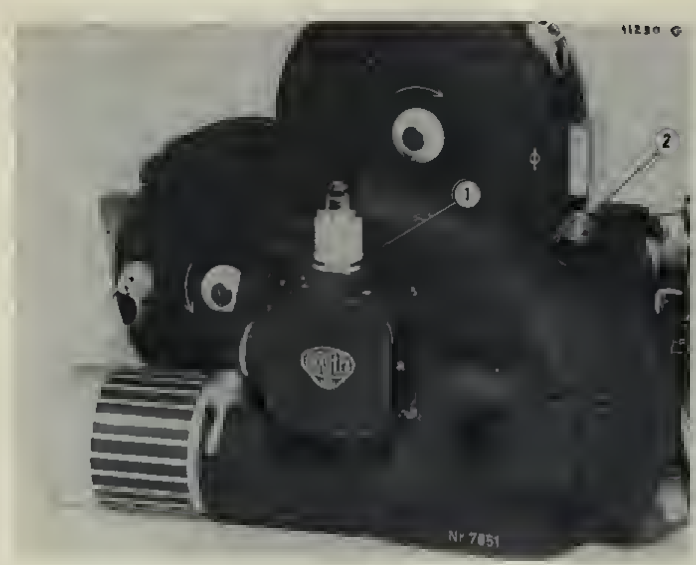


FIG 1—Arriflex 16 camera equipped with Control Signal generator (1) and electric slate system (2) By means of 60 cycle control signal generated by camera, absolute sync is assured between camera and tape recorder.

The Control Signal System Of Synchronous Recording

Small sync generator mounted on camera and geared to the camera movement delivers 60-cycle synchronizing signal to quarter-inch tape recorder.

By VICTOR JAMES

THE "CONTROL SIGNAL" system of synchronous recording on ¼ inch tape is one of the newer developments in the magnetic evolution of sync sound recording. The system has been under development both here and abroad for several years — in Germany by H. Maibak AG, and in the United States by Rangertone, Inc. ("Pilotone" and "Rangertone" are the European and American market names for essentially similar systems)

A complete picture and synchronous sound recording system is currently available from The Arriflex Corporation of America for use with either the Arriflex 16 or 35. The cameras may then be used with any tape recorder equipped with a proper control signal head. Also from Arriflex, a new tape control signal recorder is available, the Maihak MMK6 tape recorder (Fig. 4).

The general principles of the system are fairly well known and well proven. In its simplest terms, the system consists of the following. the camera, driven by a constant speed DC motor, is equipped with a small generator, geared to the camera movement (Fig. 1). When the camera operates at 24 fps, the generator puts out a small 60-cycle signal, which is carried to the recorder by a thin cable

The recorder, in addition to its normal complement of erase, record and playback heads, is equipped with a special control signal recording head. The gap of this head is centered on the tape and turned approximately 90° to that of the audio heads. Thus, the tape recorder simultaneously records both the audio signal and the control signal The tapes may of course be played back immediately. The tape so produced contains all the essentials for transfer in the sound laboratory to perforated material, either magnetic or optical, to produce a synchronous sound film. In transfer, the control signal is picked up by a special head, amplified, and the current used to control the speed of playback, as shown in the diagram in Fig. 3. The resulting track is then synchronous with the

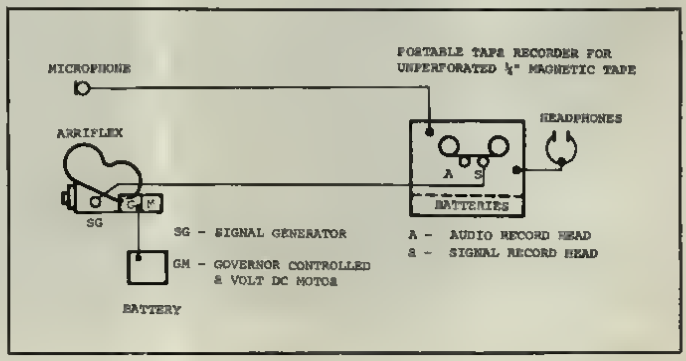


FIG 2—Diagram of Control Signal system in operation Self-powered ¼ inch tape recorder operates in normal manner. Camera, operating at 24 fps drives signal generator (S.G) which puts out 60-cycle signal, which is recorded on tape by record head (S) approximately 90° to audio signal.

picture and is from there on handled by standard editing procedures.

Three considerations in this system are of outstanding importance: *First*, the film maker has complete freedom to select his camera equipment solely on the basis of its prime function—its ability to make the finest pictures possible. His choice of camera is not compromised or complicated by the often contradictory requirements of sound recording. The choice of intermittent and registration movement, finder system, lens accommodation and every important camera feature is determined by picture considerations and convenience alone.

Second, the film maker is not bound to the limitations of sprocketed recording machines, but is free to utilize the full potentialities of tape recording, which is recognized in every branch of the audio field as the outstanding medium for high quality sound recording.

Third and finally, the "Control Signal" system is reliable, compact and inexpensive. Its addition to camera and recorder is no negligible in weight increase and bulk as to be almost unnoticeable. Synchronous sound recording on location directly from a small battery supply is as easy and as certain as recording in the studio from power lines.

The "Control Signal" system, while very simple in principle, has reached a high degree of development and refinement. The Arriflex 16 or 35, modified for this purpose, incorporates in addition to the "Control Signal" generator an electric slate, (2 in Fig. 1.) A small relay, built into the generator assembly, controls a small light, installed near the film gate, which automatically makes a visible start-mark on the film, at the beginning of each take. The same relay switches a control signal to the recorder so that the start of the 60-cycle control signal on tape serves as the start mark for the synchronous sound.

The camera may be driven by either of two motors: a synchronous motor which operates from 110-V AC, or a governor-controlled motor, which operates from a small 8-V. battery. It is of course most important that any camera speed variation be held within very narrow limits. The speed of the sync motor is held by the usually very accurate frequency maintained on AC lines. The governor-controlled motor is driven from an 8-volt battery, but its electro-mechanical governor is balanced to hold the camera speed to within 1% variation. The Arriflex 16 with governor controlled motor and control-signal generator, together with a portable, self-contained tape recorder, is about the lightest and most compact outfit yet available for high quality synchronous sound recording.

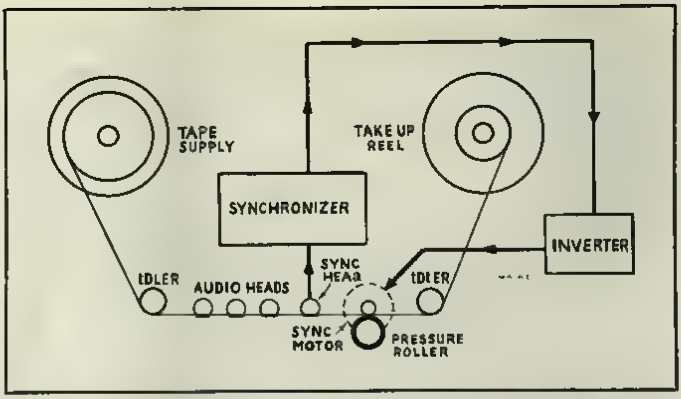


FIG. 3—Diagram of synchronous playback. Sync head picks up signal from tape and delivers it to synchronizer, which determines any necessary speed change necessary to make it exactly 60-cycles and delivers it to the inverter, whence it goes on to power capstan motor of the recorder. Tape will then travel at sync speed with any other synchronous machine. (Diagram courtesy Rangertone, Inc.)

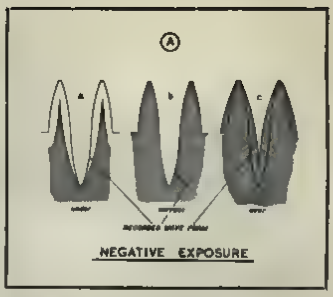
The control signal generator is geared directly to the movement of the camera proper and permanently attached to the Arriflex. It is not an appendage on the motor. Thus, the control signal is available any time, no matter which of the constant-speed motors is used. This is of special ad-

Continued on Page 762

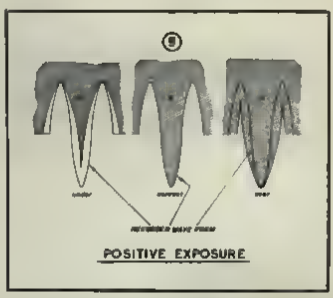
FIG. 4—Minimal equipment required for synchronous sound recordings, using the Control Signal system. In foreground, left to right: Arriflex-16 with governor-controlled motor and Control Signal generator; microphone; and 8 volt battery to drive camera. In background: The Maihak MMK6 ¼-inch tape recorder equipped with Control Signal recording head.

*The control signal system is licensed for use in the U.S.A. by Rangertone Inc., Newark, N.J.

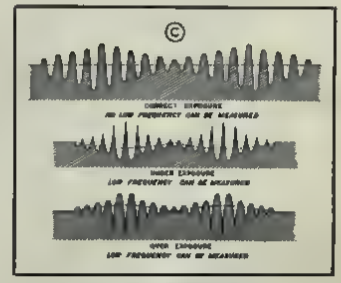
CROSS-MODULATION tests involve recording a sample sound track in such a manner that any non-linear distortion present will be manifest as such. Pictured is Cross-Modulation Measuring set designed by Goumont-Kalee of Great Britain, and installed at Independent Television News, London.



RECORDED wave form of negative sound track exposure, showing comparisons in under- and over exposure



OVER- AND UNDER-EXPOSURE is compared to that of correct exposure in this peaks-and-valleys diagram of a positive sound track exposure



BOTH OVER AND UNDER EXPOSURE produces parasitic frequencies corresponding to rate of modulation of the originally-recorded frequency.

Upping The Quality of Sound Tracks For Television Films

A variable area track, particularly on 16mm film, demands a higher standard of labaratary wark than is required far variable density tracks.

By KEVIN SEAGRAM

RECORDED SOUND for television films must so far as possible meet the stringent requirement that it shall be in quality indistinguishable from live sound, even when reproduced over a high-grade receiver. Practically all original recordings are of course made on magnetic film or tape, and the majority are transmitted in the same form; but frequently married prints with optical tracks are needed for interchange between different companies, and particularly abroad, and such prints are generally made on 16mm film.

To maintain the desired standard of quality on a 16mm optical track demands the highest degree of control in every operation. Experience has shown that laboratory work must be regularly checked.

For reproduction on the high-grade and well-maintained equipment at television stations it is widely agreed that the variable area track is superior to variable density, chiefly in regard to volume range and ground noise level. On the other hand, the maintenance of a high and consistent sound quality from a variable area track, particularly on 16mm film, demands a higher standard of laboratory work than for variable density.

Any sound transduction system is subject to certain distortions which, if they occur within the useful frequency range of the system, mar the quality of reproduced sound. Any optical sound-on-film system is subject to slit losses —a reduction of amplitude in the high-

Continued on Page 758

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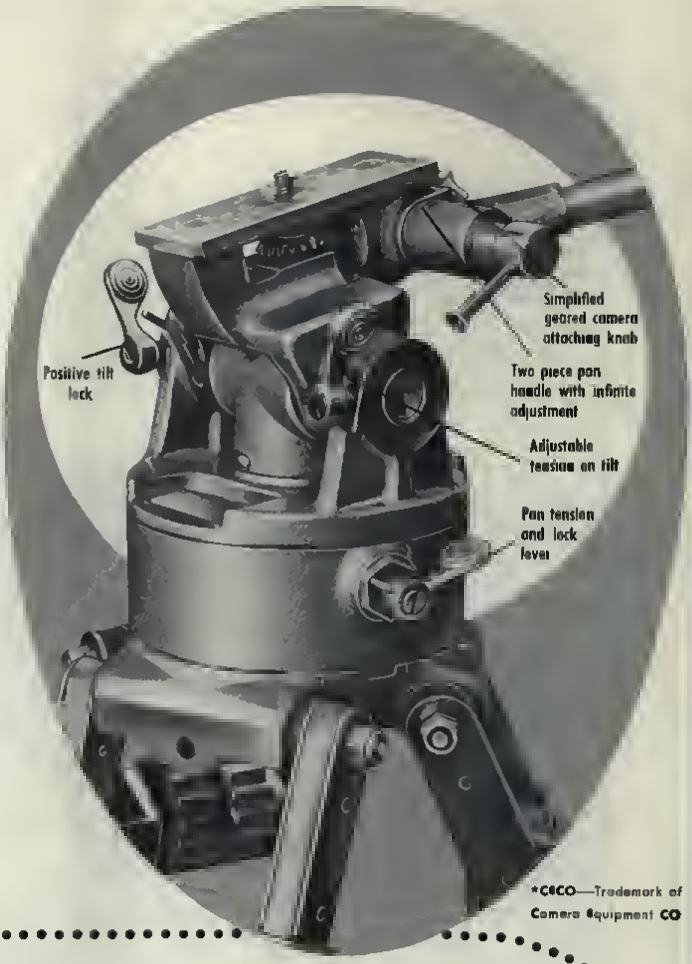
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SHOOTING "—30—" ON A SINGLE SET

Unique problems in lighting and camera movement were posed by the peculiar geography of the vast newspaper office set of this Warner Brothers' production, photographed by Ed Colman, A.S.C.

By DARRIN SCOT

ONE OF THE MOST PROVOCATIVE titles for a motion pictures is "—30—", the monicker of a new film produced and directed by Jack Webb for Warner Brothers and photographed by Ed Colman, A.S.C.

"—30—", for those not of journalistic experience, is a time-honored symbol used by newspaper reporters when writing a yarn to denote the end of the story. Warner's "—30—" is a newspaper story—a suspenseful one.

In the tradition of the memorable "Front Page," Warner Brothers' "—30—" unfolds behind the scenes of a large metropolitan daily, where a single day's routine in its editorial office involves enough slapstick comedy, nail-biting suspense, and four-handkerchief pathos to load ten television series. One gets the impression that a great deal more drama transpires among the city room personnel than ever reaches the paper's front pages.

As the entire action of "—30—" takes place within the newspaper's city room, the photography posed for Colman all the problems usually encountered in "one-set" productions. But most important it meant that every shot for this 96-minute dramatic picture would have to be filmed within a single cluttered interior; that subtle light changes would be necessary to create visually the progression of time from dusk to dawn; that dramatic lighting plus the right camera angles and camera movement would be required to establish and maintain a visually-interesting narrative; and that suspense and drama should be pointed up photographically without resorting to camera tricks that might detract from the realism of the story.

On a Warner Brothers' sound stage, the single interior set approximately 200 by 60 feet was erected. It duplicated in appearances the city room of the Los Angeles Examiner. When Colman and his crew assembled for the initial day's shooting, they found instead of the usual wide-open set one jammed with desks, chairs, teletype equipment, waste baskets and coat

CINEMATOGRAPHER Ed Colman, left, uses target to tone down light falling on trophy in hands of Jack Webb, star, producer and director of "—30—." The Mitchell camera is mounted on collapsible boom of crab dolly, which was used to advantage in negotiating mobile camera shots amid clutter of desks, chairs, wastebaskets, etc., of newspaper office set.

racks in a honeycomb of cubicles and alcoves.

The vast set with its peculiar geography, posed more than the ordinary set lighting problems. Its entire length was hung with fluorescent lighting fixtures in the manner of its real-life counterpart, and these were to burn constantly throughout the action. Fluorescent lamps produce light of singularly flat quality, which is incompatible with modernday cinematography. Thus to get the desired dramatic modeling in lighting the player's faces, the voltage feeding the fluorescents was dropped so their intensity was lowered to a point where they would register bright enough in the scene, but without putting out too much photographic illumination.

The functional lighting of the players was accomplished with the conventional studio set lighting units—mostly Juniors and Baby Juniors—which were hung between the beams of the set or placed on floor stands. Since Webb and Colman both favor low camera angles for their dramatic effect, this imposed the additional problem of concealing the fluorescents whenever they appeared in the camera finder.

Except for the Editor's office, no "wild" walls were provided which could be moved if necessary to make photography easier. Thus, Colman and his crew had to work around obstacles just as they would had the picture been shot in the actual city room of the Los Angeles Examiner.

Colman, whose cinematographic experience includes the photography of the well-known "Dragnet" television series and several recent feature films, including Walt Disney's "Shaggy Dog," is a stickler for lighting that looks natural. "In lighting a dramatic subject," he says, "I work toward extreme contrast between black and white. Shadows create depth and roundness, therefore I use a minimum of fill light.

"I like a situation," Colman continued, "where I can use a 'natural' light source as a key (if there is enough of it) and just supplement it with a bit of fill light and a few kicker lights. After all, Nature knows how to light things best. I just follow her example."

"—30—" was photographed on Eastman Plus X, Type B film, a negative stock favored by Colman because, he says, it has good contrast, sharp resolution and fine grain.

Colman has more or less standardized on f/4 as the working aperture for black-and-white photography, and it was f/4 that he used for "—30—", which required a light level between 180 and 200 foot candles. The f/4 aperture, he says, provides adequate depth of field and at the same time enables him to use relatively low level illumination, which, among other things, makes the players on the set more comfortable.

HIGH IN RAFTERS of Warner Brothers' sound stage, Ed Colman, right of camera, discusses possible camera angle for a high shot with Jack Webb

The basic plot of "—30—", when finally separated from a myriad of subplots, concerns the vigil kept by the city room staff while local police and firemen and the newspaper's own reporters search desperately for a little girl who has fallen into a storm drain during a heavy rain that threatens to fill the water conduits and drown the child.

Since rain was a key element in the suspense build-up of the story, it was vital to make its presence felt during every moment of the drama unfolding indoors in the city room, but without ever letting it overwhelm the photography or the story itself.

Thus the fact it is raining heavily outside is made obvious by a flow of water down the window panes. Here, lights carefully placed outside the set and played on the windows create reflections of the water action on the walls. Colman was careful, in planning this lighting, not to allow the reflections to fall on the faces of players. "It would have become visually annoying after a while," he commented.

The only time the action of "—30—" ventures in any way outside the city room set is when the editor, played by Jack Webb, looks out the window of his office and sees his wife leaving a telephone booth across the street. The sequence was done in process. The background plate for the scene was actually photographed from a second-story window of the Los Angeles Examiner at night, with the street and pavement below wetted down to tie in with the rainstorm premise already established in the preceding scenes.

To make the process shot in the studio later, the windowed segment of the city room set was mounted on a high platform on the sound stage. The process background projector was set up on the stage floor below and beamed toward a translucent screen suspended from the stage rafters about five feet outside the window. The screen was canted at an angle to keep it parallel

Continued on Page 760

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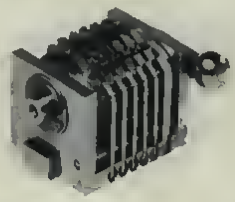
- There is a simple adjustment for dispensing the amount of ink required. The unit has a small brush wheel to clean the numbering element after the number is applied.
- A micro switch cuts the power when a roll of film is completed.
- A Veeder Root counter checks the film footage.
- A keeper holds the film in place for sync mark and spot coding.
- The handle in front permits the operator to manually turn the numbering block to the desired position for a number change.
- Running speed is between 80 to 110 feet per minute.



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- The numbering block generally consists of two letter wheels or one number and one letter wheel manually operated and four number wheels which move automatically and number from 0001 to 9999. All numbers can be reset by hand to begin at any desired number.
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MONSTERS AND MINIATURES

Technical excellence of "Gorgo," new horror film, result of improved techniques, faster color negative.

By RAY MERCER, A.S.C.

MINIATURE SETS, a plethora of special effects, and a huge animated monster combine to make the King Brothers' forthcoming "Gorgo" one of the most technically interesting productions ever made in a London studio. Because Ray Mercer & Co. was commissioned to put the finishing touches on the production's special effects in Hollywood after shooting on the London sound stage was completed, the assignment took me to England in an advisory capacity.

On August 10th, MGM's huge Elstree sound stage, long a closed and closely-guarded set, was finally opened to visitors. What they saw there left even the most hardened studio veterans goggle-eyed.

Not that the scene was wholly unexpected. Those in the industry had known for nearly two months that Hollywood's King Brothers were in production on a million-dollar feature about a monster that cuts a destructive swath through the heart of London. They were aware—the professionals, at least—that such a picture would require extensive use of miniatures. But they were scarcely prepared for the magnitude of the elaborate miniature structures which occupied the entire area of the largest sound stage in Europe. (See photos.)

Here, in the stage's tank—which is some 300 feet in length—were erected a River Thames setting in miniature, scaled approximately 1-to-30. Complete to the most minute detail were the Tower Bridge and Pool of London, clear up to and including Westminster, Big Ben and the Houses of Parliament. As the reader may see in the accompanying photos, more painstaking care could not have gone into the scale reproduction of these historical landmarks of British culture.

When the King Brothers first conceived their project nearly two years ago, they reasoned that for real success more was needed than unmotivated and indeseriminate destruction on the screen. The primary requisite was a

Continued on Page 764

MINIATURE—Constructed on scale of 1-to-30, this realistic miniature set of Tower Bridge and Pool of London on the Thames is remarkable for fine craftsmanship in even the tiniest detail

REMARKABLE miniature set was constructed by King Brothers at MGM Studio in Elstree, England, on sound stage regarded the largest in Europe. Minimum of lighted windows in set lend a note of realism to scene—a commercial shipping dock on River Thames

FOR COMPARISON—Large arrows point to two set lamps which give some idea of the scale and extent of construction of the miniature River Thames set. Small arrow, left, points to crane-mounted camera just visible at left edge of photo.

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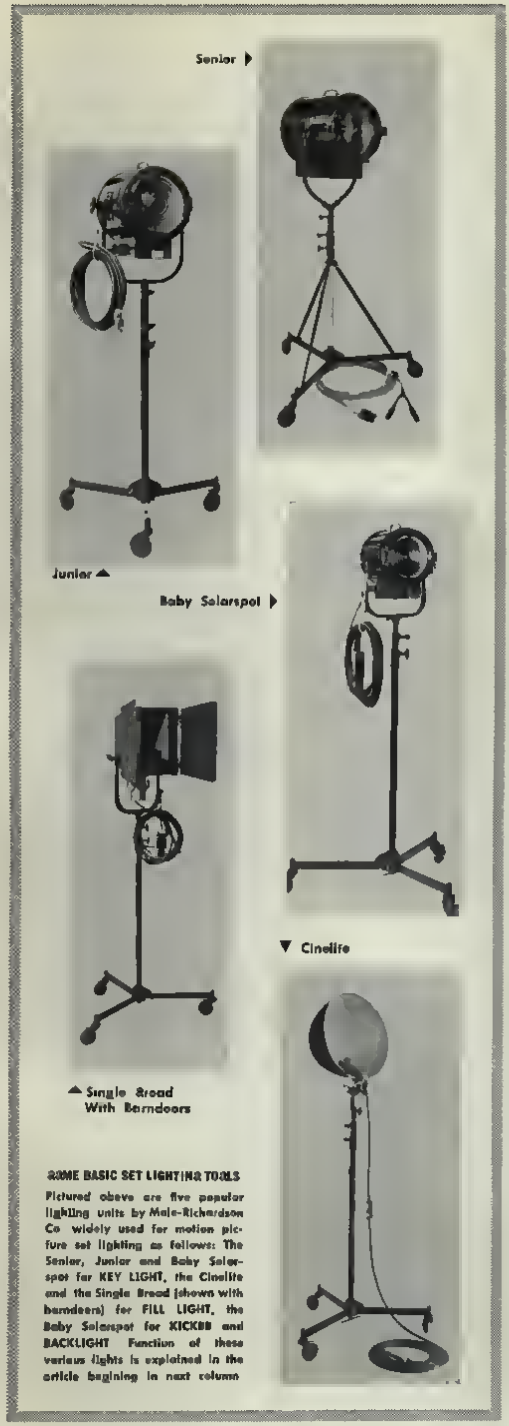


SOME BASIC SET LIGHTING TOOLS

Pictured above are five popular lighting units by Mole-Richardson Co. widely used for motion picture set lighting as follows: The Senior, Junior and Baby Solarspot for KEY LIGHT, the Cinelite and the Single Broad (shown with barndoors) for FILL LIGHT, the Baby Solarspot for KICKER and BACKLIGHT. Function of these various lights is explained in the article begining in next column.

MOTION PICTURE SET LIGHTING

The basic professional techniques for lighting interiors for motion picture photography.

(Reprinted from "The Aperture"—workshop publication for 16mm Film producers published by Colvin Productions, Inc., Kansas City, Mo.)

MOTION PICTURE SET LIGHTING is both a science and a creative art. There are no hard and fast rules or procedures in lighting a set or subject for the purpose of exposing motion picture film. This gives rise to some pros and cons, as does almost every other endeavor in the media.

Set lighting is just as creative as any other phase of film production. It doesn't get as much publicity as some film operations, because the best motion picture lighting calls no attention to itself. It unobtrusively helps set the mood and present the subject.

Almost without exception every scene to be exposed, both interior and exterior, can be improved with supplemental lighting. You may ask how the rays of the sun and their intensity can be changed. They can't, of course, but you would be surprised to discover how many outdoor or location shots have been filmed with the use of reflectors and camera filters to obtain the desired effect on the screen.

It isn't a question of lighting or not lighting a set or scene. They all need light. The main thing to remember is this: Good lighting must be planned in advance and built up, rather than flooded on a set in a flat, uninteresting manner.

We said earlier that there are no hard and fast rules for set lighting. While this is true, there are some basic elements to be mastered which have withstood the test of time, and you can't get a better recommendation than that.

Basic Lighting Set-up

In this article we are primarily concerned with interior and sound stage lighting. In this area of interest the best lighting is usually simple. All lighting should be natural, as if lighted by the obvious, apparent light sources of the setting. And remember this: shadows are pretty, even arty, but there must be a reason for them or they will detract from the subject of the scene.

In the vernacular of motion pictures, there are four basic subject lights to be taken into consideration. They are: the "key", the "fill", the "kicker" and the "backlight". Let's consider them in order.

The key light provides the apparent principal source of

Continued on Next Page

directional illumination falling upon a subject or area. Exposure settings are determined from the key light. Spotlights are usually used for key lights because their light is easily controlled. Once the intensity of the key light has been established it should remain the same throughout the sequence being filmed. This emphasizes the importance of pre-planning to the creation of good lighting on a set. The person responsible for the lighting of a set should be as familiar as the director with the action to take place on any set and the area to be covered by any camera movement.

Key light intensity is determined, usually, by the light power ratio to the size of the set and the ability of the subject to work under lights Most acting talent work better and for more sustained periods of time when the key lights are not above 250 foot candles. For this reason the camera department at Calvin prefers to keep the key light at a minimum intensity of 250 foot candles on normal subjects under average conditions to expose Ektachrome Commercial at f/2.8 with a 180 degree shutter. Other camera stocks require different set-ups. This should not necessarily be construed as a norm. The main thing to remember is to keep the key light intensity constant once it has been established on any sequence.

Secondary or "Fill" Light

The fill light is just that—it "fills" or "lightens" undesirable shadows on a subject or scene, and determines mood. In most cases scoops or pans with diffusers work best as fill lights as their light casts a minimum of shadow. The fill light is a supplementary light and should not affect the basic exposure reading obtained from the key light.

The ratio between key and fill lights

TABLE OF GLOBES FOR MOTION PICTURE SET LIGHTING EQUIPMENT

Explanation of "Base" abbreviations: Mog.—Mogul, Bip.—Bipost, Med.—Medium, Sc.—Screw, D.C.Bay.—Double Contact Bayonet.

Globe No.	Watts	Code Ordering	Standard Package	Bulb	Base	Filament	Initial Lumens	Hours Life	Degrees Kelvin	Amps at 120 V
1	10,000	10KG96	1	G-96	Mog. Bip.	C-13	325,000	75	3350	83.3
2	5,000	5M/G64/3	2	G-64	Mog. Bip.	C-13	165,000	75	3350	41.6
3	5,000	5M/T64/1	2	T-64	Mog. Bip.	C-13	165,000	75	3350	41.6
4	5,000	5M/G64/7	2	G 64	Mog. Bip.	C-13	140,000	150	3200	41.6
5	5,000	5M/T64/3	2	T-64	Mog. Bip.	C-13	140,000	150	3200	41 6
6	2,000	2M/G48/14	9	G-48	Mog. Bip.	C-13	65,500	25	3350	16 7
7	2,000	2M/T48/4	6	T-48	Mog. Bip.	C-13	65,500	25	3350	16 7
8	2,000	2M/G48/18	9	G-48	Mog. Bip.	C-13	56,000	100	3200	16 7
9	2000	2M/T48/1	9	T-48	Mog. Bip.	C-13	57,000	100	3265	16 7
10	1,500	1500(Claar)	6	PS 52	Mog. Sc.	C-7A	33,000	1000	3050	12 5
11	1,500	1500/IF	6	P5 52	Mog. Sc.	C-7A	33,000	1000	3050	12 5
12	1,500	1500PS52/78	6	P5-52	Mog. Sc.	C-7A	40,000	100	3200	12.5
13	1,000*	PH/4 Photoflood	24	PS-35	Mog. Sc.		33,500	10	3400	8.3
14	1,000	1M/G48/B	6	G 48	Mog. Bip.	C-13	25,000	100	3150	8.3
15	1,000	1000(Claar)	6	P5-52	Mog. Sc.	C-7A	21,500	1000	3050	8 3
16	1,000	1000/IF	6	P5-52	Mog. Sc.	C-7A	21,500	1000	3050	8 3
17	1,000	1M/P552/77	6	P5-52	Mog. Sc.	C-7A	26,500	75	3200	8,3
18	1,000*	PH/1M/PS40/1	12	P5-40IF	Mog. Sc.	C-7A	26,500	60	3200	8 3
19	750	750/T24/5	24	T-24	Mad. Bip.	C-13	15,000	200	3080	6.3
20	750	750/T24/13	24	T-24	Mad. Bip.	C-13	24,500	12	3350	6.3
21	750	750/T24/16	24	T-24	Mad. Bip.	C-13	20,500	50	3200	6.3
22	750	750(Claar)	6	P5-52	Mog. Sc.	C-7A	15,600	1000	3000	6 3
23	750	750/IF	6	P5-52	Mog. Sc.	C-7A	15,600	1000	3000	6.3
24	500	500/T20/60	12	T-20	Mad. Bip.	C-13	16,000	8	3350	4.2
25	500*	500 (Clear)	24	PS-40	Mog. Sc.	C-9	9,900	1000	3000	4 2
26	500*	500/IF	24	P 40	Mog. Sc.	C-9	9,900	1000	3000	4 2
27	500	500/T20/63	12	T-20	Mad. Bip.	C-13	13,000	35	3200	4 2
28	500#	PH500/PS25/5	24	PS-25IF	Med. Sc.	C 9	13,000	60	3200	4 2
29	200**	PH200/T10/5DC	24	T-10	D.C. Bay	2CC-8	4,700	25	3100	1.7
30	200	CCM	24	T-8	D.C. Bay	2CC-8	4,600	25	3075	1.7
31	150	CGP	24	T-8	D.C. Bay	2CC-8	3 500	25	3085	1.3
32	100	100T8/DC	24	T 8	D.C. Bay	CC-13	1 950	50	2955	.8
33	75	C8X	24	T 8	D C 8ay	CC-13	1 300	50	2920	6
34	50	PH50T8/22DC	24	T-8	D C Bay	CC-13	775	50	2870	.4

The above list, compiled by the Mole-Richardson Company, includes all incandescent globes which can be used in M-R set lighting equipment, but not necessarily adaptable only M-R equipment. All globes listed are correct for black-and-white photography. They also may be used for color photography with M-R equipment according to the recommendations given in chart on next page.

*May be used in M-R Type 22 Single Broad or Type 23 Double Broad and the 1000 Bell Lamp if a mogul to-mogul extension is inserted in lamp socket.

**For use in the M-R Type 404 Midget spotlight.

#May be used in the M R Type 16 Cinelite by inserting a mogul to medium reducer in the socket.

will depend on the type of film being used and mood to be expressed. Calvin's cameramen consider a ratio of 2 to 1, key to fill, as normal on an average subject. In other words, a reading of 250 foot candles from the key light will require a reading of 125 foot candles from the fill — depending on the mood.

"Kicker" and Backlight

Backlights and "kickers" are used to highlight a subject, also to add depth and "roundness". They require considerable control. Spotlights are used for kickers and backlights because of these control requirements Gobos and barndoors are useful accessories in this area where backlight must be pinpointed so as not to interfere with the other lighting requirements Basically, kickers and backlights function to separate the subject from the background. In relation to the camera position, the key light is placed on the side of the subject away from the camera; the fill light on the side facing the camera, and at the same height; the backlight opposite and in line with the camera, above and behind the subject.

Background Lights

Usually the background and foreground of a set require separate lighting. Once the subjects within the set are

Continued on Page 754

LIGHTING FOR COLOR PHOTOGRAPHY

The table below provides a basis for utilizing certain of the incandescent globes described in chart on opposite page with Mole-Richardson lighting equipment for color photography. The data applies equally to all color films having similar color balance characteristics

FOR FILM BALANCED FOR DAYLIGHT

A filter must be used with CP (color photography) globes listed below for matching to daylight as indicated in Macbeth Filter column.

LAMP*	GLOBE #s	MACBETH FILTER
Senior	2-3	415 B
Junior	6-7	412 B
Baby	20-24	407 B

*For other equipment use a No. 26 gelatin, in single or double thickness, in a diffuser frame before the lamp

FOR FILM BALANCED FOR 3350°K OR 3400°K

LAMP	GLOBE NO.
Senior	2-3
Junior	6-7
Baby	20-24
Cinelite	13
Single Broad	13
Double Broad	13

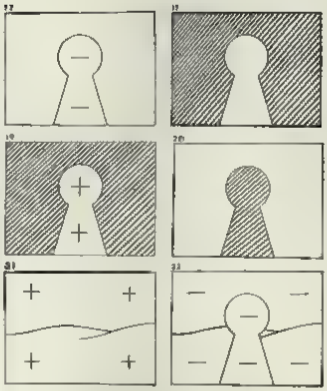
FOR FILM BALANCED FOR 3200°K

NOTE: A special line of globes has been designed to provide illumination for film balanced for 3200°K, but many other globes are usable since they are in the range specified. In the following table, only the special globes are listed

LAMP	GLOBE NO.
Senior	4-5
Junior	8
Baby	21-27
Double Broad	12-17-18
Single Broad	12-17-18
Cinelite	18-26

More On Black-and-White Traveling Matte Process

By ROBERT L. HOULT, FRPS, FBKS
Formerly Technical Adviser, Pinewood Studios, England



Figs. 17 to 22, inclusive.

UNACCOUNTABLY, during the preparation for our October issue of Robert L. Hoult's initial article on the traveling matte process (pp. 612) a number of paragraphs were omitted. These are vital, of course, to a complete understanding of the process described. We sincerely regret this error and hope that we can make amends both to our readers and to Mr. Hoult by including the omitted material in this issue.

Readers are asked to refer to their copy of the October issue and to the illustrations on pages 612 and 613, to which reference is made in the ensuing paragraphs. The omitted paragraphs properly belong in the column on page 635 of our October issue, following the third paragraph therein, which we shall repeat here for orientation purposes.—EDITOR:

The second and third component images are in effect different aspects of the foreground and as such must be produced simultaneously. There are processes which produce these two images alternately, in association with intermittent lighting arrangements. Such a technique inevitably results in time-parallax between the two series of images and prevents their satisfactory superimposition, leaving in general a "line" around any moving foreground objects. The omitted text follows:

If then we are to produce simultaneously the second and third components (which for simplicity we will represent again by Figs. 3 and 6), we must first conceive a method of so lighting our foreground subject that the two different aspects can be derived from it. The method which has been chosen is to arrange the foreground subject in front of a plain backing, to illuminate the foreground subject with colored light, to illuminate the plain backing with light of complementary color, and to photograph the assembly simultaneously on two films, each of which is sensitive to one only of the two colored lightings used. In this manner, one film records an image of the foreground subject, but records no image of the illuminated backing; whereas the other film records an image of the illuminated backing, except where this image is interrupted by the foreground subject, from which no exposure results.

These two films are exposed simultaneously in a beam-splitting camera of conventional design, shown diagrammatically in Fig. 24 and, in full, in Fig. 25. A single lens forms an image at each of two gates arranged mutually at right angles, the light rays from the lens being divided by the semi-reflecting interface of a glass prism block. In this way, geometrically similar images are formed on the two

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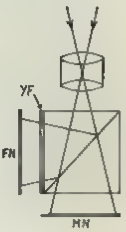

FIG 24—Diagram of beam splitting system of J.A.B.O camera, below

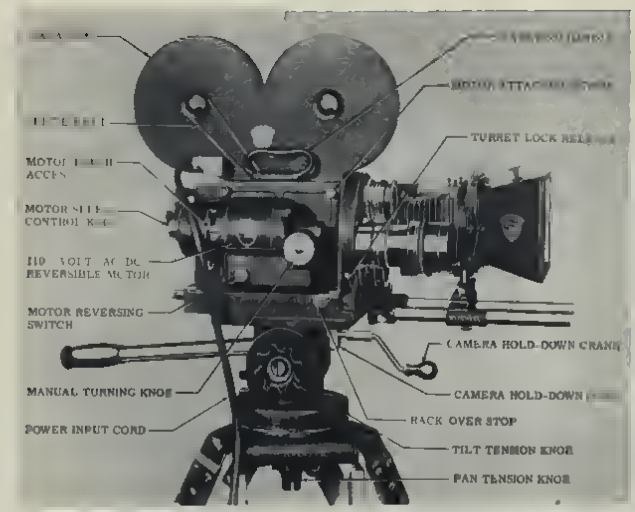

FIG 1—Right hand side of the Mitchell "16" camera. Designed for professional 16mm motion picture production, it incorporates most of the well-known features of the famous 35mm Mitchells used on most Hollywood sound stages.

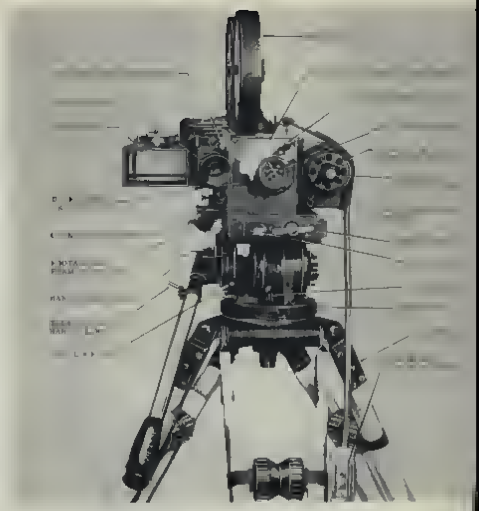

FIG 2—Rear view showing also the Mitchell friction head and Mitchell tripod, which are extra accessories. The 110-volt motor shown is interchangeable with four other models.

Motion Picture Cameras | *PART VII*

THE MITCHELL "16"

All the exclusive features, the dependable performance, and the versatility of the 35mm Mitchell are incorporated in the Mitchell "16".

IN EVERY RESPECT, the Mitchell "16" measures up to its 35mm counterpart in ruggedness, performance and dependability—which is to be expected of the camera, coming as it does from the same company that for so many years has produced the 35mm Mitchells that, with few exceptions, have photographed the majority of the world's entertainment films.

The Mitchell "16" and its accessories have been designed for use in the field and in the laboratory as well as on the studio sound stage. The camera, with its range of five interchangeable motors, provides speeds from 8 to 128 frames per second, and its variable shutter further extends its versatility and its ability to meet the exacting photographic requirements encountered today by industrial and research cinematographers. The early models (bearing serial numbers up to 227) and current models (with serial numbers 227 and upward) are basically the same.

The camera consists of an L-shaped base and a camera box which slides horizontally on the base in dovetail tracks (gibs), permitting the operator to move the camera box to either focusing or photographing position. This operation is known as "rackover" or "shiftover", and is illustrated in the drawing on the opposite page.

A 400-foot film magazine is located on top of the camera box (see photos above) and a viewfinder is mounted at the left side of the camera on a dovetail bracket incorporated in the upright section of the base.

A rotating lens turret at the front of the camera base accommodates four lenses. Each of the motors available for the camera (there is a choice of five, as will be described in more detail later) is mounted on a door which attaches to the right side of the camera box.

A matte box assembly is mounted in front of the camera, attached to the base. The camera base rests on a friction head which, in turn, may be attached to a tripod or the camera mounting of any of the standard camera dollies, perambulators, and cranes in use today.

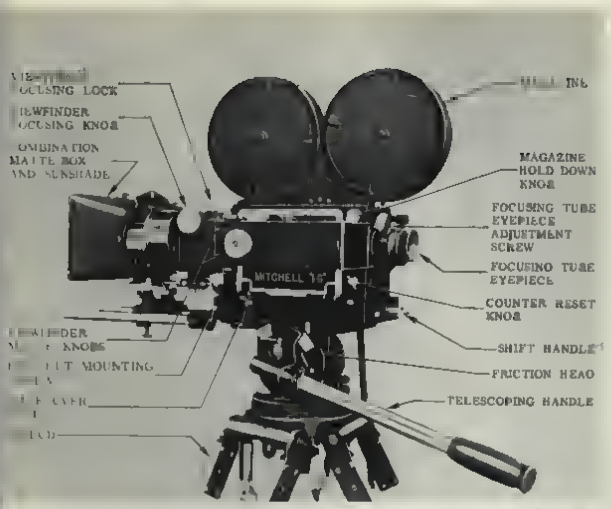

FIG. 3—View of left-hand side of the Mitchell "16" camera, with its various features indicated. Also available, but not shown, is the Mitchell Viewfinder Follow-focus Attachment. Camera is finished in black crackle enamel

All the aforementioned basic features may be seen in the three photos above, which have been carefully prepared to locate and identify most of the camera's other components and features as well.

In the ensuing paragraphs, we shall describe some of these features in more detail. The rackover (or shiftover) is one of the camera's salient features. It affords the cameraman opportunity to momentarily shift the camera box laterally so that he can see, by means of the focusing tube on one side of the camera, the image created on the film plane by the lens in photographing position, also to check on the sharpness of focus, etc. The relative normal and shiftover positions of the camera are shown in the accompanying drawing.

Shifting the camera from the photographing position to the focusing position is done by operating a release button and handle on the rear of the base. A locating plunger in the base fits into either of two recesses in a plate beneath the camera box to locate the box accurately in either position. A tapered shiftlock cam on the right side of the base contacts actuators on two electric switches located in the camera box to prevent the motor from operating when the box is in focusing position.

The camera's high-speed movement consists of a double-prong pull-down claw that moves the film into place behind the aperture, and twin registration pins that hold the film stationary at the moment of exposure. A registration pin throw-out knob is provided which enables the operator to momentarily withdraw the registration pins when threading film.

The aperture plate is readily removable for cleaning or inspection. It is made of stainless steel, hard chrome plated, and has raised surfaces at the side of the film path which allow the film to come in contact with the plate only outside the picture area. A filter slot is provided at the front of the aperture plate.

Another salient feature is the buckle trip. This is located behind the rear film stripper, and automatically shuts off the camera motor should the film buckle or break during operation.

Mitchell "16's" bearing serial numbers below 227 have a two-blade dissolving shutter built into the camera box. Later models have a three-blade dissolving shutter. For making dissolves manually, there is a shutter adjusting lever at the rear of the camera, which can also be set at fixed shutter openings in increments of 10 degrees. The lever moves across a calibrated scale, which indicates the degree of shutter opening. The scale is graduated from 0 degrees to a maximum opening of 175 degrees on cameras previous to serial No. 227; on later models, the maximum opening has been increased to 235 degrees. A positive pin lock prevents the shutter setting from changing while the camera is being operated. The shutter is so synchronized with the camera movement that when its open segment is in front of the aperture the film is at rest, with the registration pins engaged. The film advances while the opaque segment of the shutter covers the aperture.

The Mitchell magnifying prismatic finder long has been considered one of

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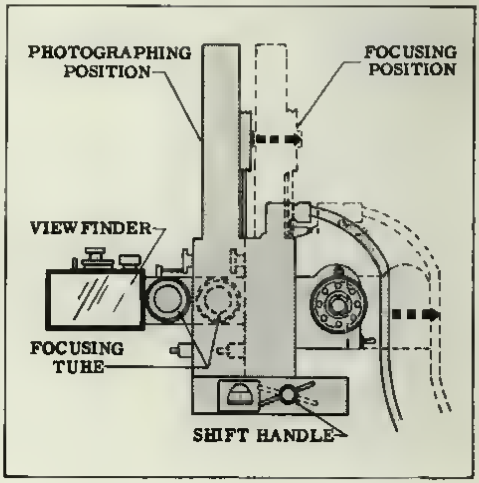

FIG. 4 — Diagram shows camera in normal operating position and in shiftover position for focusing the camera lens through the focusing tube

THE MITCHELL "16"

Continued from Page 753

the finest ever designed for a motion picture camera and, as it is with all Mitchell 35mm cameras, is standard equipment with the Mitchell "16". On this camera it is attached to the left-hand side, alongside the focusing tube. Adjustable mattes, controlled by two calibrated knobs on the top and side of the finder, may be set to mark the fields of lenses of various focal lengths. The image seen on the ground glass is upright and correct, right to left. The image area is approximately 1⅞" x 3⅝". Without matting, the field corresponds to that of a 17.5mm lens. An adapter (reducing lens) may be used to adjust the finder image area to correspond to that of a 15mm lens. The finder may readily be swung upward to a vertical position to permit access to the camera door without disturbing the parallax adjustment.

Follow-focus Attachment

The Mitchell Viewfinder Follow focus Attachment is an extra accessory obtainable at time of purchasing the camera, or later, as desired. This attachment, when mounted on the camera in conjunction with the viewfinder, affords the operator complete control over picture framing and lens focusing for action shots where subjects move toward or away from the camera, or whenever the camera is used for dolly shots. It is especially useful when shooting at close, critical range. By means of the attachment's single follow-focus control knob the camera operator can focus the camera lens and simultaneously adjust the viewfinder for parallax. In this operation focus is controlled through a gear of the attachment which engages a corresponding gear ring on the camera lens mount.

Either Bausch & Lomb Baltar coated lenses in Mitchell precision focusing mounts or Eastman Kodak Cine Ektar lenses in type "C" mounts are available with the Mitchell "16". The lenses are assembled in micrometer focusing mounts with iris diaphragms, and each lens has a geared focusing ring that facilitates its use with the Mitchell Viewfinder Follow-Focus Attachment. Footage and iris adjustments are clearly marked on the lens mounts.

Four 400-foot film magazines are supplied with the Mitchell "16". Both compartments of each magazine are corduroy-lined and lightproof. The lighttrap through which the film emerges and re-enters consists of three velvet-lined rollers held in contact at even pressure by spring tension. The film hubs, which are removable to facilitate daylight loading, are made to fit standard film cores.

A choice of two combination matte box and sunshades is available—the Model 1-V, which is all metal, and the bellows type Model 1-V-50. The first contains holders for pola screen and filter and mounts on two steel extension tubes attached to a support bracket, which mounts on the camera base. The unit can be moved forward to permit rotation of the turret or access to the lenses. The bellows type model has provisions for both horizontal and vertical adjustments. It contains holders for filters and diffusion disks, gauze slides and pola screen.

A choice of five motors are available for driving the Mitchell "16": two 24-volt DC high-speed motors; 110-volt AC-DC high-speed motor; 110-volt AC-DC reversible motor; and a 115-volt AC synchronous motor. As stated earlier, all of the motors provide a variety of speed ranges to meet individual needs. Each motor is built integral with a door which fits on the right side of the camera box. Power from an external source is supplied to the motor through a cable incorporating an "On-Off" switch, the plug of which matches a receptacle at the top rear of the camera box. Each motor has a manual turning knob for rotating the movement shaft while the camera is being threaded.

The Friction Head

To mount and use the Mitchell "16" on a tripod or other conventional camera mount, the manufacturer provides, as an extra accessory, a friction head (see accompanying photos) the function of which is comparable to the "tilt-pan head" used with cine cameras. The camera is attached to the friction head by a single camera hold-down screw, which is rotated by turning a knob directly beneath the friction head top plate. Further tightening may be accomplished by a small hand crank inserted in the knob.

The panoram-tilt mechanism of the friction head is so designed that the camera may be rotated 360 degrees in either direction, and tilted in the vertical plane approximately 45 degrees above or below the horizontal plane. Both panoram and tilt movements may be made at the same time by means of the telescoping control handle.

The entire mechanism of the Mitchell "16" is manufactured to within extremely close limits, assuring the accuracy and precision required in the exacting fields of professional motion picture production for which it has been designed. ■

TRAVELING MATTES

Continued from Page 751

films, FN and MN. FN denotes the foreground negative and MN the matte negative. YF is a yellow (minus-blue) filter.

The film stocks used are: (i) for FN· a panchromatic film of normal sensitivity and contrast; (ii) for MN· a blue-sensitive film of relatively low sensitivity and high contrast. The color of YF is chosen so as to be complementary to the sensitivity of MN. Then FN becomes in effect sensitive only to yellow (minus-blue) light, while MN is sensitive only to blue light.

The foreground subject is illuminated by light which has been passed through filters which correspond in color to YF. The backing is so lit that it emits only light which is complementary to YF. Hence, FN will record only the foreground subject, the backing being effectively unilluminated, while MN will record only the illuminated backing, the foreground subject being effectively unilluminated.

FN and MN are processed in standard baths to yield, on the one hand, a picture negative of normal characteristics, and on the other hand a matte negative in two tones only, as are shown diagrammatically in Figs. 17 (for FN) and 18 (for MN). From these two negatives are made positive prints, giving us respectively a fine-grain duplicating positive of the foreground (Fig. 19) and a matte positive or traveling matte (Fig. 20).

Fig 19 may now be compared with Fig. 3, and Fig. 20 may be compared with Fig. 6. Independently, we prepare from the negative of a background subject a fine-grain duplicating positive as in Fig. 21.

We now produce our composite scene on a new negative film, by photographing in turn (i) Fig. 19 and (ii) a bipack composed of Figs. 20 and 21.

Continued on Page 757

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TRAVELING MATTES

Continued from Page 754

This operation is carried out in an optical printer

The camera of the optical printer is loaded with fine-grain duplicating negative film and exposure is made of Fig. 19. The film in the camera is rewound, and a second exposure is made of the bipack of Figs. 20 and 21. When developed, a composite negative is obtained as in Fig 22

Fig. 22 is now our composite negative. It may henceforth be considered, p*ari passu*, as if it were an original camera negative It may be cut into a film, and prints for projection may be made from it as required Providing proper sensitometric procedure has been followed in the printing stages described, a high-quality image will be obtained which compares favorably with an original camera negative. It is, however, undesirable to make further duplicates from this composite negative, or degradation of the image will become apparent Therefore, it is desirable that any further printing operations, such as additional foregrounds, superimposed titles, dissolves, etc., should be carried out simultaneously with the printing of the composite negative. This can readily be done and need never result in other than a first generation duplicate negative for the composite. There is at this stage of the process wide scope for the introduction of many tricks and novel effects.

(The text is concluded, beginning with the fourth paragraph, page 635, of the October issue.—Ed.*)* ■

35mm Color Prints

In 35mm color film production, release prints may be made by any one of the three following processes: 1) direct from the camera negative, with intercut dupe sections incorporating optical effects, 2) by making separation positives, then a dupe negative from which release printing is done, or 3) making an interpositive, then an internegative, and printing from the internegative. Printing from the camera negative is to be avoided, since there is no protection provided. The separation process has been replaced, for all practical purposes, by the interpositive method.—*General Film Rewind*

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UPPING QUALITY OF TV FILM SOUND TRACKS

Continued from Page 742

er frequencies, both in recording and reproduction, as the wave-length of the sound on the track approaches the effective width of the scanning slit. Such losses are normally corrected by a rising characteristic in the amplifier circuits.

A non-linear distortion, peculiar to light-modulated transmission systems, is known as "cross modulation." It is caused by image growth and retraction due partly to photo-chemical effects and partly to internal reflection within the film.

Distortion-free Sound

As indicated in the accompanying diagrams, when the variable-area track carries a modulation of low amplitude, the angle of the peaks and valleys is fairly broad, and sound is free from distortion. But as the amplitude increases, the angles of the peaks and valleys narrow; the peaks lose their sharpness and the valleys tend to clog. Naturally, if the track is under-exposed the former effect predominates, and if the track is over-exposed, the latter. In either case, the effect is the production of parasitic frequencies corresponding to the rate of modulation of the originally-recorded frequency; such distortion is most commonly audible as the "shushing" of sibilants.

It is fortunate that non-linear distortion in an original recording can be largely cancelled out in printing, provided both negative and positive tracks are exposed to suitable densities. The positive density must first be approximated to provide the maximum signal-to-noise ratio in reproduction. The optimum negative density will vary with different recording systems, different film stocks and different processing characteristics; the values are controlled by what are known as cross-modulation tests.

Such tests involve (1) recording a track in such a manner that any non-linear distortion present will be manifest as cross-modulation, the recording being made at various test densities; (2) printing from each of these negative tracks a series of positive tracks again at different densities; and (3) then measuring the degree of cross-modulation in these prints. A series of curves can be plotted which will show clearly the conditions in which cross-modulation is at a minimum.

A suitable signal for cross-modulation tests may be generated by adding two tones of fixed frequency separation. But a more flexible method consists in recording a fixed carrier frequency high in the audio range, the amplitude of which is modulated at a lower frequency.

Gaumont-Kalee, of Great Britain, has designed and is presently marketing cross-modulation measuring equipment designed to make test recordings and to read the degree of distortion. In this equipment a carrier frequency is obtainable at 4, 6, 7, 8 or 9 Kc/s, which is amplitude-modulated by a 400 c/s frequency. The latter frequency is directly recorded for use in setting the level of recording, and as a reference. Two further frequencies are also available: a 1 Kc/s signal is useful for general testing, and for the measurement of densities a low frequency of 37 c/s is provided.

The measuring unit (see photo) consists of three components built into a single housing. The top panel is the cross-modulation analyzer Type 1704, the middle panel is the oscillator unit Type 1705; and the bottom panel, Type 1706, carries the supply circuit. The components can, where desired, be supplied separately for rack mounting, in which case the supply circuits will probably not be needed.

Making A Test

The test gear is mounted conveniently close to the recorder. In making a test, the desired carrier frequency is selected—generally 4 Kc/s for 16mm film and 7 or 8 Kc/s for 35mm—and is adjusted until the recorder is 100% modulated. Turning the output switch to "MOD" will cause the carrier to be 80% modulated at 400 c/s; a pre-set control insures that the peak level of the signal remains unaltered.

The modulated signal is now reduced by 2db and is recorded. The switch is moved to REF, when the 400 c/s signal will be recorded at the same level. Whenever a new film stock or a new laboratory is used, recordings are generally made at several settings of the recording-lamp current.

Prints received from the laboratory are run through a play-off head, and the signal is fed into the analyzer unit. It passes through a band pass filter having a flat response from 375 to 425

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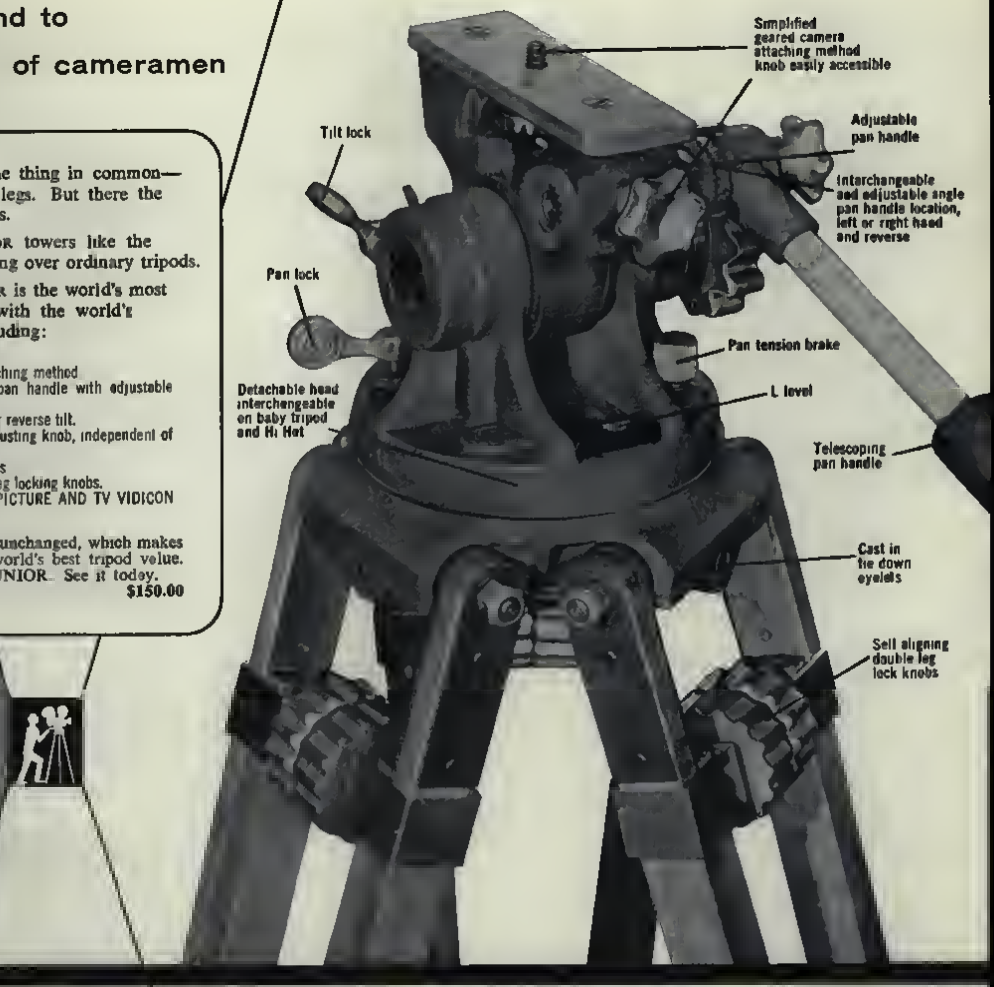
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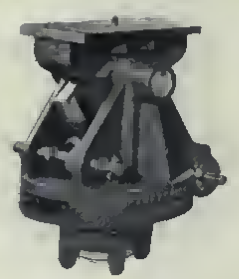

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c/s., thus removing the carrier frequency, together with power hum, noise and harmonics, leaving only the 400 c/s component. Where the print is entirely free from non-linear distortion, no trace of 400 c/s signal remains, but any distortion will be measured on the meter.

The cross-modulation content is expressed as the ratio in decibels between the original 400 c/s reference tone and the parasitic 400 c/s signal. The meter reads from +2db to −15db, and an attenuator enables readings to be taken down to −55db.

Obviously it is essential that such measuring should maintain a high degree of consistency. The oscillator circuits of the Gaumont-Kalee measuring unit embody thermistors for amplitude stabilization, and the voltmeter circuit employs feed-back, giving a flat response to within ±0.25db from 300 c/s to 10 Kc/s. ■

SHOOTING "—30—" ON A SINGLE SET

Continued from Page 745

to the camera and the projetcor in order to insure proper focus and perspective. The "rain" effect was introduced between the screen and the window. The realism of the scene was further enhanced by following it with a reverse angle shot of Webb, taken outside the window, shooting up toward the city room as the rain pours down.

The cluttered composition of the city room set posed one of the major photographic problems whenever mobile camera shots were to be made to follow action. Here the object was to retain pictorially the cramped aspect of the office while accomplishing the physical feat of dollying the camera into, out of, and around the clutter. The resultant dolly shots do much to achieve a continuity of space and to convey the feeling of one large office with many areas, each having its own intimacy.

The desks were spaced just barely far enough apart to permit the camera, mounted on a crab dolly, to squeeze through. The crab dolly, incidentally, is perhaps the most versatile of mobile units used on the sound stage. It not only can negotiate extremely narrow passages and doorways, but its variable four-wheel steering enables it to execute sharp right angle turns as well as circles of small diameter.

Cinematographer Colman has some very definite ideas about moving camera shots, ideas which are shared by many other top cameramen in the industry. "The camera should only be moved during a take when there is a logical reason for it, as when following action," he says, "never just for the sake of movement alone. When the actors move, then the camera can move. When they do not, then the camera should remain stationary—unless, of course, camera movement is necessary to emphasize a particular story point."

An interesting sidelight on the mobile camera technique Colman used for "—30—" is the way a zoom lens was employed in conjunction with the dolly-mounted camera to "lengthen out" some dolly shots where it was not feasible to dolly beyond a certain point. For example, a scene would start with a long shot and the camera would then dolly-in as far as possible, until blocked by a desk or other object. As the dolly eased to a stop, the zoom lens operator would take over, picking up the forward movement and continuing to push in to a big closeup. A sharp camera crew was essential to achieving such a transition with smoothness and subtlety.

In other instances, the zoom lens—which had a range from 38mm to 150mm—was used in the conventional manner. At several points in the story the camera is framed on a group. A particular story point is made and the lens is zoomed in for a closeup to show the expression on the face of a player reacting to some action or passage in the dialogue.

Despite the notable results achieved with a zoom lens on this production, Colman is well aware that a zoom is no panacea for photographic problems on the set. He points out that most zoom lenses are tricky to operate smoothly, have several unfortunate technical shortcomings, and are often misused. A major disadvantage, he says, is that zooms have an inherent "flatness" which produces an effect on the screen very much like that of zooming in on a still photograph. While a zoom can sometimes be used to simulate a dolly shot, Colman points out that it cannot supplant a mobile camera shot because it fails to create the illusion of depth and roundness that a dolly shot affords. Available zoom lenses, moreover, do not have the crisp resolution of high-grade conventional lenses, he explained further, and it is therefore necessary to stop down more to get an image of desirable clarity. Nevertheless, he concluded, zoom lenses have a definite place in contemporary film production when intelligently used with specific effects in mind.

Besides the zoom lens, Colman used 25mm and 30mm wide-angle Baltar lenses to photograph the major part of the picture—occasionally employing a Schneider 18.5mm lens whenever an extreme wide-angle shot was desired. The so-called "normal" perspective 50mm lens was used only for closeups.

Incidentally, there are a great many closeups in this film (although not the eyebrow-to-lip extreme closeups that were typical in the "Dragnet" series). Both Webb and Colman feel that people are the foremost consideration in any screen story and it is important to show their emotions clearly. Colman was careful, however, not to let the closeups for this picture "hang in the air," so to speak. Instead, he framed as close to the subject as possible, retaining just enough of the background to orient the subject with respect to the overall geography of the set.

In addition to special techniques and innovations, and the lenses, camera dollies and other equipment used in filming a production, Colman emphasized that behind all this must be a dependable and well-integrated camera crew. Colman's men have worked together as a crew since the inception of the "Dragnet" TV series. So smoothly and efficiently did they function throughout the filming of "—30—", the production was completed in 12 days, although it had a shooting schedule of 18. ■

A Circarama motion picture is photographed with a battery of eleven 16mm cameras arranged in a circle to record a continuous pictorial panorama on eleven separate films. The pictures are projected by eleven synchronized projectors set up around and behind a large circular screen. This screen actually is eleven separate screens mounted in a circular pattern. There is a narrow slit separating each through which the picture is projected on the screen directly opposite.

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CONTROL SIGNAL SYSTEM FOR SOUND RECORDING

Continued from Page 741

vantage, because it is standard practice more and more to use and record the control signal on the tape, even when both camera and recorder are driven by synchronous motors. This is a very useful safeguard against momentary current fluctuations and interruptions in the tape or film movement, either of which may jeopardize a synchronous recording.

It is noteworthy that the Arriflex is unencumbered by the sync signal generator and may be used as widely as ever, from missile tracking to micro work. It may be as conveniently hand-held as ever; magazines, varifocal lenses, the blimp are all as readily used as before. The efficiency and economy of camera operation are equally available for silent and sound filming.

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It is notable that the Arriflex camera, when equipped with the signal generator, is not limited to operate with any one make of recorder. In fact, it may be used with any good quality ¼" tape recorder. The chosen recorder must of course be equipped with a control-signal head. Such installations are readily available from Rangertone, Inc., Newark, N.J. Similarly, Arriflex cameras already in the field may be equipped with the signal generator by the Arriflex Corporation of America in New York City.

The control signal system available on Arriflex 16 and Arriflex 35, as supplied in the USA by the Arriflex Corporation of America, will be fully compatible with the American Rangertone system and original recordings made with this system may be readily transferred in any lab equipped for Rangertone re-recording. Such laboratories are to be found in major cities and film centers across the country.

Most professional film makers will use the original tape recordings for immediate transfer to perforated film for preparation of combined picture and sound release prints. However, original tape recordings in special cases may readily be utilized in several other very useful ways. It is possible, for example, to project the original film and play back the original tape in sync. This may be done on equipment already available. In practice, the original tape is played back on a standard tape machine, equipped with a special head to pick up the control signal. The signal is amplified and fed to an auxiliary synchronous motor on the projector. The auxiliary projector motor then varies the speed of the projector sufficiently to hold the picture in sync with the sound.

A somewhat similar arrangement may be made in the case of TV transmissions for news rushes and similar material. Since in this case the projector must be locked in with the TV scanning system, the control signal is amplified and used to control the speed of the tape playback, using a Rangertone Synchronizer, which then holds the tape motion in sync with the picture.

The Control Signal system will produce synchronous recordings of highest professional quality in the studio or on location. Its greatest attraction, of course, will be for location recording where weight and bulk of equipment are prime considerations. ■

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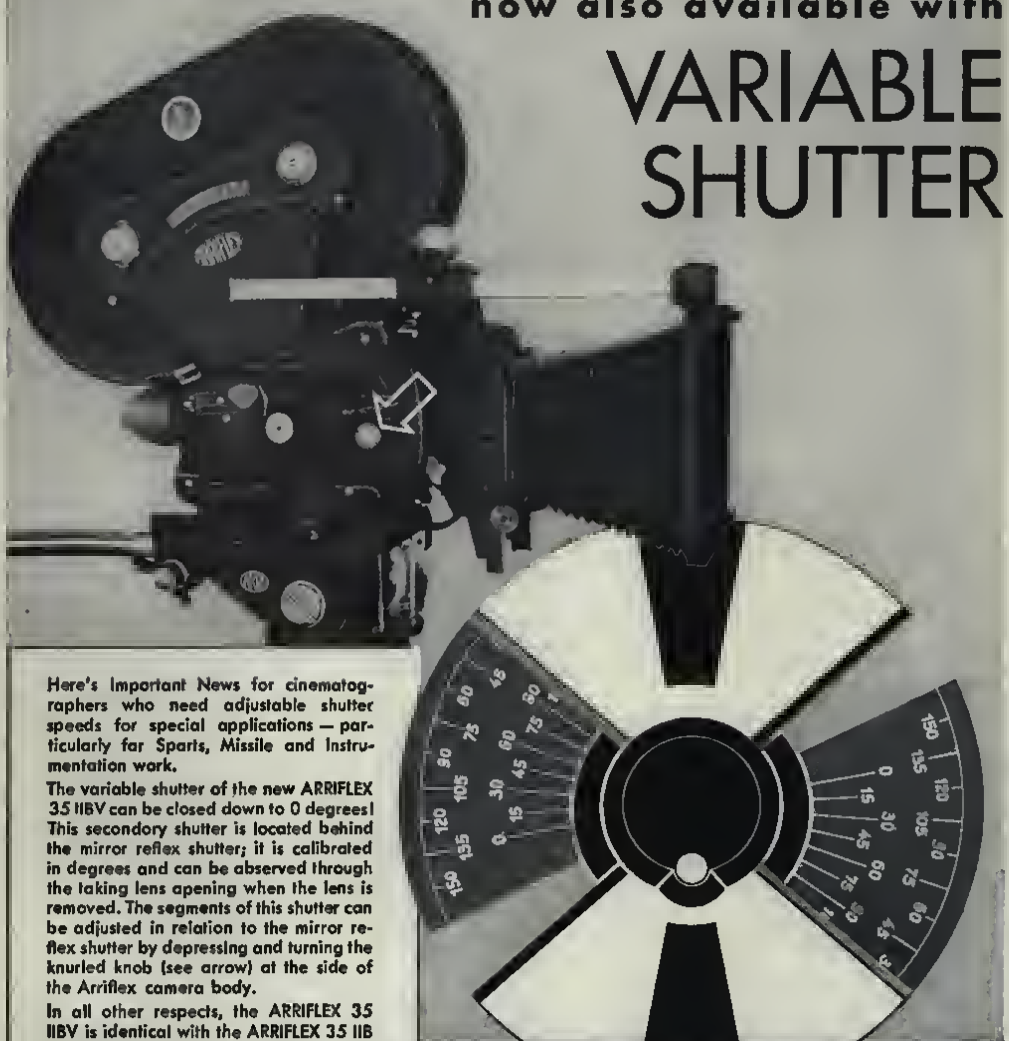

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MOTION PICTURE SET LIGHTING

Continued from Page 751

properly lighted, other areas of the set which will appear in the frame need attention so the photography will have a uniform appearance.

Many times the lighting of a subject will provide most of the light needed for background and set light. In general background lights are illumination separate from that provided for principal subjects or areas. By the same token, set lights are lights out of frame in the foreground. Both are used to fill otherwise dark areas on the set. A word of caution: variations abound.

Lighting for Multiple Cameras

For speed and efficiency in production, it is best to design sets and plan action so that lighting can be done in advance, with minimum changes between scenes. Background and set lights can be placed in position ahead of the actual filming to allow the light crew to concentrate on lighting subject and principal areas during the shooting. This advance planning saves considerable time once the cameras start to roll.

To provide maximum space on the floor for camera movemant and the mike boom, if sync shooting is involved, overhead lighting is most desirable wherever possible. Key lights, kickers, background and set lights will normally adapt to overhead requirements. Fill lights, however, must be kept low—on the same level with the camera.

Effect Lighting

Effect lighting can be compered to character make-up on an actor, in that character make-up is used to change the appearance of an acter, and effect lighting is used to change the appearance of a set or scene. Careful study should be given to the effect desired and completely planned in advance. It will require experimentation to a degree, and is never the same on two different assignments requiring the same basic approach. In general, low and high fill-lighting will emphasize mood. Plain subjects, factory interiors with mostly grey machinery, intricate machine operations, etc., can be made more interesting and appealing through the application of shadow areas with a purpose and the use of colored gelatins on the lights.

Obtaining Depth

Depth in photography is obtained with subject placement and camera angles. Lighting also plays an important part. Here, again, there are some basics to keep in mind

Perspective—The wider the angle of the lens, the greater the depth. Placing objects closer to the camera can give a similar effect of depth.

Lighting—Side and back lighting gives more depth to a scene than front or flat lighting.

Focus—Greater depth can be obtained by letting the foreground or background go out of focus. This duplicates the manner in which the human eye actually sees objects.

Color—Background colors should be different than principal subject colors (flesh tones, clothing, etc.) to prevent the subject from blending into the background.

Movement—Camera movement or subject action within the frame adds depth. Background haze also tends to make the background appear farther away.

It is impossible to list more than a smattering of information on motion picture lighting here. The main purpose of this article is to emphasize the importance of lighting to the finished product. The subject of lighting could feasibly be a college major, with experience in the field the requisite for a thesis and doctorate. Our point is this: Nothing can be sluffed-off in a truly good production. An excellent script, top direction, perfect casting and quality sets can be marred by poor lighting of one scene. ■

MONSTERS AND MINIATURES

Continued from Page 747

story—a rattling good one. Six script revisions finally netted a tense yarn of Man's stupidity and greed, climaxed by action of a huge anguished monster over 200 feet tall taking a short-cut through the heart of London to rescue its kidnapped offspring — a "junior-size" monster a mere 40 feet in height. In this understandable act

of maternal devotion, Mama Monster naturally took the most direct path to her objective. She could hardly be blamed if she ignored such obstacles as the Tower Bridge and the Houses of Parliament which stood in her way.

The Mama Monster I found to be one of the most outstanding jobs of design and construction of this sort used in any motion picture to date. It consisted of a molded rubber body operated by a man encased within it, and having a control panel almost as complicated as a jet airliner's through which the Monster's life-like action was set in motion and controlled. Besides the usual movement of fore-paws and feet, the Monster could be made to swing its lethal tail in a 180 degree arc, twitch its ears, blink its red-tinged eyes, and even roll back its lips in a spine-tingling snarl before opening its ponderous jaws to receive some hapless victim. With this full-scale monster figure, the King Brothers were able to achieve greater realism than would have been possible with a small-scale animated figure — the bane of all previous monster pictures.

Matte Shots Also Used

In addition to the extensive use of miniature sets and the two monster figures, the production also involved extensive traveling matte and split-screen shots, underwater sequences, and combinations of all these. This required a screen director having substantial experience in the incredible intricacies involved in the shooting. For this task the King Brothers selected Eugene Lourie, well-known in both Paris and Hollywood. Cinematographer Freddie Young did the photography and Tom Howard, another British cameraman, is credited with the special effects executed at Elstree.

According to the King Brothers, the time was at hand for a hang up, big-league monster picture because of certain recent technical developments which would enable them to achieve greater realism in the action. One of these was the availability of Eastman's new fast color negative. The increased sensitivity of this new film would insure better color results in the slow-speed camera work required in photographing the miniature sets in course of destruction. Other assets were the numerous recent new developents in miniature set construction, and in the improved techniques of construction and operation of the monsters themselves.

From a technical standpoint alone, the production of "Gorgo" is worthy of detailed study. For nothing like it has ever been produced on a Hollywood sound stage. ■

FILMING A THRILLER

Continued from Page 739

and-white photography of "All The Kings Men" and "From Here To Eternity" headed the first-unit camera crew. Guffey had only recently finished shooting "They Came To Cordura" for Columbia, using Panatar lenses with exceptional results. Wilfrid Cline, A.S.C., who received an Academy nomination last year for the photography of "The Last Wagon," was in charge of second unit photography. This unit photographed all of the spectacular action sequences, including the opening fight on the rim of the Grand Canyon, scenes of the automobile crashing over the canyon edge, the hair-raising chase on the Gold Road, scenes of the amphibian craft flying and landing on the canyon floor, and the violent climactic fight in the aerial tram car.

For the picture's general photography, Mitchell NC cameras were used by both Guffey and Cline. And for making shots in tight quarters where the NC's could not be used, a 35mm Arriflex was employed. Particular attention was given to the choice of lenses for each camera. I believe that the Panatar lenses, developed by Panavision, are far and away the sharpest of all lenses for photography in the CinemaScope aspect ratio, and are devoid of the horizontal distortion characteristics which mark the closeup shots of so many anamorphic type lenses. About 80 per cent of "Edge of Eternity" was shot with the 50mm and 75mm Panatars, and the remainder with Bausch & Lomb anamorphic lenses.

The logistical phase of the production was an important consideration in view of the distant, rugged location site. Transporting equipment, etc., from Hollywood directly to the location site situated at the Grand Canyon and some 85 miles distant from Kingman, was a caravan of more than 20 vehicles. These included a 10-ton prop and grip equipment truck, 5-ton construction rig, 30-passenger bus, a "stretchout" limousine, trucks and trailers for two helicopters, a 15-ton Chapman camera crane, crab and western dollies, two

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small buses, electrical truck with generator, two camera cars for chase sequences, and two station wagons.

Location headquarters was Kingman, Arizona. Crew and cast commuted to the location site daily in a DC-3 operating from the Kingman airport. The flight took only 20 minutes compared to about four hours that would be required to travel the dusty, twisting road by automobile.

Helicopters Aid Filming

Shooting on the rim of the Canyon, the second unit camera crew used two Bell 47-G2 helicopters—one for photography, the other for transportation and at one stage to take part in action sequences. The 'copter used for photography was stripped of its plastic "bubble" and a Mitchell camera mounted in the cockpit. Piloting this ship was veteran Bill Hartley who had worked with cinematographers before and knew something of their photographic problems. When the mid-air fight action in the aerial tram car was shot, instead of permitting the 'copter blades to "chatter," Hartley allowed the ship to drift with the moving car, thus avoiding vibrations that would have been transmitted to the camera. He used the 'copter very much like a crab dolly, moving it around the subject action to suit the director

For shots in this fight sequence, we decided to use a helicopter in the background (see photo) because we felt it would lend a measure of depth perspective and at the same time provide a reference to orient the comparative size of the tram car suspended over the deep canyon.

We also shot traveling matte background plates from inside the tram car. These included a forward view and rear, side, and three-quarter views —all in CinemaScope aspect ratio. It had been decided to use traveling mattes in preference to process because the fight in mid-air in the tram car was to be the picture's big climax, and I wanted this to be as realistic as possible — even though mattes in color are more expensive than process. To shoot the matte backgrounds, we had the second helicopter hover in the background some distance beyond the car and in the same position it had occupied in the master scenes filmed earlier. In the final composite print, there is an almost perfect match.

The most striking example of the effectiveness of the matte shots is exemplified in the scene of the tram car moving through the intermediate tower located a thousand feet out in the canyon

The principle action of the fight on the tram car was shot in the studio against a blue backing, then superimposed on a matte background which had been photographed from within the moving car as it traveled through the tower. On the screen the result is fully realistic as if we had actually shot the fight at close quarters in mid-air. Pictorially, results are sharp as a tack and the quality holds all the way through.

Shooting the entire fight sequence was as thrilling as it was challenging to all who took part in it. We would run the tram car out into the canyon about 900 feet and do the action as many times as necessary for an acceptable take. The stunt actors who doubled in these scenes for the stars were professional aerialists and so the 4,000-feet of space between them and the canyon floor didn't seem to bother them at all

Net Protects Stunt Man

At the start of the sequence, there is a thrilling scene where the deputy leaps off the tram shed onto the departing car in which the murder suspect attempts to escape with the girl. It was a difficult shot to make because the shed quarters were most confining —about 18 to 20 feet in width. By means of a heavy-duty power hoist, the crab dolly was lifted onto planking which had been laid parallel to the car inside the shed and formed a ramp. The shot was planned so that if the stunt man missed the car, a net stretched below and out of camera range would save him in a fall. Beyond the rim of the canyon was a sheer drop of 3,000 feet. None of us quite knew what to expect. As the camera dolly was pulled back and the tram car started, the stunt man ran down the catwalk and made a leap for the car and safely gripped the bar which our special effects man had mounted on the car for this purpose. As the car continued to move out and beyond the safety net, the stunt man was holding on with only one hand, with no safety whatsoever below him. Although the action was perfect and the shot a "print in one take," the stunt man volunteered to do it again if we thought it necessary. After the car moved out and beyond the intermediate tower a thousand feet away, it disappeared from sight below a cliff as it followed

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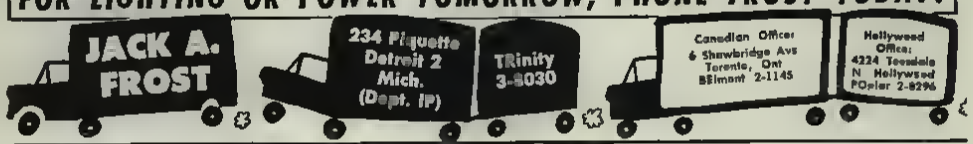

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the natural curve of its suspension cable.

The scene called for actor Mickey Shaughnessy, playing the murderer, to hang from the car side and call for help. The torque of the suspension cable whipped the car and caused it to swing wildly in the wind. The stunt man ostensibly clung to the grip attached to the framework of the car, but actually his support was further secured by a safety harness he wore under his garments and airplane cables extending downward to stirrups under his feet. At times, the car and stuntman were swung wildly by the wind in a 90° arc. Luckily, this shot was accomplished in one take, also.

Emil Osterman, operating the second-unit camera mounted in a helicopter, had his 200-pound frame wedged behind the Mitchell to photograph a dummy, doubling for Shaughnessy, as it fell from the swinging car. With the 'copter's protective bubble removed to accommodate the camera, for Shaughnessy and the pilot it was like sitting in an armchair out in space.

Anticipating the fall of the dummy, pilot Hartley who had his craft prop-

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erly centered on the scene, decided to "stay" with the falling dummy on its descent. Just as it fell, he nosed the 'copter forward into a dive at about 120 miles an hour and dropped down nearly 1,800 feet in a free fall. Surprised and breathless, Osterman nevertheless kept the falling dummy centered in his finder frame all the way.

A violent dust storm that lasted two days failed to slow our filming activities. Instead, we made it part of the story—although we did what we could to keep down the dust by borrowing an old water wagon and wetting down the area in which we worked. To safeguard our cameras from possible damaging effects of the dust storm, we sent back to the studio for a technician to check and clean the cameras. Fortunately we experienced not a single scratched negative.

The picture's opening shots, staged on the rim of the canyon, involved an automobile hurtling toward the canyon rim and plunging over it to destruction. The whole thing took a bit of setting up. After we had the car rigged and ready to go into action, we got the camera ready for a subjective point-of-view shot through its windshield as it hurtles toward a man standing on the canyon rim. The action of the scene was to be shot in two stages, for photographic purposes: the car speeding toward the canyon rim, and then its plunge over the edge into the canyon itself. The first stage had to be shot without allowing the car to go over the rim. To insure this, yet at the same time enable us to get realistic action into the scene, strong cables were attached to the car and extended some distance to the rear to supports anchored to a depth of four feet in solid rock. As an extra precaution, another cable was extended from the automobile to a 10-ton truck.

Thrill Ride for Cameraman

The first stage of the action was photographed by the camera operator riding in the car and shooting with the Arriflex, hand-held. The ride was rough and quite a jolt to him as the car, reaching the limit of its protective cables, snapped to a sudden stop. (I'm quite sure he still has the imprint of the Arriflex finder cup on his eye!) In filming the second stage of the action, we did it in a long shot using two cameras.

To film the chase scenes on the Gold Road, we elected to use a Ford convertible instead of the standard camera car. But first we removed its shock absorbers and tied down the springs to eliminate vibration as much as possible. I have been asked if these shots were made with the camera undercranked. Actually, the camera operated at normal sound speed as the car negotiated the road, sometimes skidding around corkscrew turns at 70 miles per hour. The resulting point-of-view shots really rock an audience.

To make closeup shots of Cornel Wilde and the pilot within a small two-place Piper Cub that would simulate actual flight, we contrived a method of doing this without having to do it by process or making the shots later on the sound stage with a mockup of the plane. Out on a broad, flat field we set up the camera and focused it on the plane, which had been tipped at an angle of about 30 degrees. The camera boom arm was dropped down and the camera tilted so it was at the same angle as the plane, and the gearhead rotated to simulate movement. The Cub's engine was started and set to idling speed to give the plane a bit of realistic vibration and the shots then made against a blue sky.

To get unusual shots of the more spectacular action in the picture, helicopters were used to lower camera crews and their equipment to the floor of the canyon. It was in this manner that we photographed the first landing ever made by an amphibian craft on the Colorado river at the bottom of the canyon.

All in all, the location shooting for "Edge of Eternity" went smoothly, even though we shot in all sorts of weather and never missed a day. Despite the risks involved, there were no accidents. We wound up the location sequences three days ahead of schedule. ■

PHOTOGRAPHIC ASSIGNMENTS

Continued from Page 730

METRO-GOLDWYN-MAYER

GIUSEPPE ROTUNNO, "The Fair Bride" (Titanus Prod.; shooting in Sicily with Ava Gardner and Dirk Bogarde. Nunnally Johnson, director.

N.B.C.

ALAN STENSVOLD, ASC, "You Bet Your Life"* with Groucho Marx. Bob Dwan and Bernie Smith, directors.

PARAMOUNT

LESTER SHORR, ASC, "Bonanza"* (NBC-TV) with Michael Landon and Dan Blocker.

ROBERT SURTEES, ASC, "Bay of Naples" (Scribe Prod; VistaVision & Technicolor; shooting in Rome) with Clark Gable and Sophia Loren. Mel Shavelson, director.

ROBERT BURKS, ASC, "The Rat Race" (Technicolor, Perlberg-Seaton Prod.) with Tony Curtis and Debbie Reynlods. Robert Mulligan, director.

HASKELL BOGGS, "Cinderfella" (Technicolor; Jerry Lewis Prods.) with Jerry Lewis and Ed Wynn. Frank Tashlin, director.

REPUBLIC STUDIOS

GEORGE DISKANT, ASC, "Richard Diamond Private Detective"* (Four Star Prods.) with David Janssen; "Robert Taylar Detectives"* (Four Star Prods.) with Robert Taylor.

CARL GUTHRIE, ASC, "Wichita Town"* (Four Star Prods.) with Joel McCrea.

HARRY WILD, ASC, GEORGE DISKANT, ASC, "Wanted Dead or Alive"* (Four Star Prods.) with Steve McQueen.

GLEN MACWILLIAMS, ASC, "Black Saddle"* (Four Star Prods.) with Peter Breck and Russell Johnson.

EMMETT BERGHOLZ, "Troubleshooters"* (Filmaster Prods.) with Keenan Wynn and Bob Mathias. Robert Altman, director; "Death Valley Days"* (Filmaster Prods.) "Man on the Beach"* (Pilot; Filmaster Prods.) John Peyser, director.

HOWARD SCHWARTZ, "Law of the Plainsman"* (Four Star Prods.) with Michael Ansara; "The Rifleman"* (Four Star Prods.) with Chuck Connors and Johnny Crawford.

HARRY WILD, ASC, Commercials*.

REVUE STUDIOS

MACK STENGLER, ASC, "Leave it to Beaver"* (Gomalco Prods.) with Barbara Billingsley and Hugh Beaumont. Norman Tokar, director; commercial*.

JOHN RUSSELL, ASC, RAY CORY, ASC, "General Electric Theatre"* (Revue Prods.)

ELLIS THACKERY, ASC, JOHN RUSSELL, ASC, LIONEL LINDON, ASC, "Coronado 9"* (Revue Prods.)

BENJ. KLINE, ASC, NEAL BECKNER, "Wagon Train"* (Revue Prods.) with Ward Bond.

LIONEL LINDON, ASC, "Ford Special"* (Color, Revue Prods.)

RAY RENNAHAN, ASC, BENJ KLINE, ASC, EMIL HARRIS, "Laramie"* (Revue Prods.)

JOHN WARREN, ASC, "Markham"* (Revue Prods.) with Ray Milland; Commercials*.

RAY CORY, ASC, LIONEL LINDON, ASC, NEAL BECKNER, "Riverboat"* (Revue Prods.) with Darren McGavin.

WILLIAM SICKNER, ASC, "The Deputy"* (Revue Prods.) with Henry Fonda.

RAY RENNAHAN, ASC, ELLIS THACKERY, ASC, LIONEL LINDON, ASC, EMIL HARRIS,

NEAL BECKNER, "M Squad"* (Latimer Prods.) with Lee Marvin.

JOHN RUSSELL, ASC, JOHN WARREN, ASC, "Alfred Hitchcock Presents"* (Revue Prods.)

GILBERT WARRENTON, ASC, ELLIS THACKERY, ASC, RAY RENNAHAN, ASC, EMIL HARRIS, "Shotgun Slade"* (Revue Prods.).

RAY RENNAHAN, ASC, JOHN RUSSELL, ASC, "Staccato"* (Revue Prods.).

JOHN WARREN, ASC, NLAL BECKNER, "Whispering Smith"* (Revue Prods.).

RAY COSY, ASC, WILLIAM SICKNER, ASC, "Wells Fargo"* (Overland Prods.) with Dale Robertson.

ELLIS THACKERY, ASC, "Johnny Midnight"* (Revue Prods.).

TWENTIETH CENTURY-FOX

JAMES WONG HOWE, ASC, "The Story on Page One" (C'Scope, Co. of Artists Prod.) with Rita Hayworth and Anthony Franciosa. Clifford Odets, director.

SAM LEAVITT, ASC, "Seven Thieves" (C'Scope & Color) with Edward G. Robinson and Rod Steiger. Henry Hathaway, director.

LLOYD AHERN, ASC, "Adventure in Paradise" with Gardner McKay and Weaver Levy.

WILFRID CLINE, ASC, "Five Fingers"* with David Hedison and Luciana Paluzzi.

WILLIAM DANIELS, ASC, "Can-Can" (Todd-AO; Jack Cummings Prod.) with Frank Sinatra and Shirley MacLaine. Walter Lang, director.

JOSEF STAHL, Jr., "The Girl in the Red Bikini" (Edw. L. Alperson Prod.; C'Scope; shooting in Majorca) with Mark Stevens and Joanne Dru. Byron Haskins, director.

WILLIAM MELLOR, ASC, "Crack in the Mirror" (C'Scope, Darryl F. Zanuck Prod.) with Orson Wells and Brad Dillman. Richard Fleischer, director.

ELLSWORTH FREDRICKS, ASC, "Wild River" (C'Scope & Color, shooting in Tennessee) with Montgomery Clift and Lee Remick. Elia Kazan, director.

LEON SHAMROY, ASC, "Wake Me When It's Over" (C'Scope & Color, Mervyn LeRoy Prods.) with Ernie Kovacs, Dick Shawn and Margo Moore. Mervyn LeRoy, director.

CARL BERGER, ASC, "Young Jesse James" (C'Scope) with Ray Stricklyn and Willard Parker. William Claxton, director.

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JAMES DROUGHT, Commercials*

JOSEPH BIROC, ASC, "Ice Palace" (Shooting in Alaska) with Richard Burton and Robert Ryan. Vincent Sherman, director.

THOMAS TUTWILER, ASC, Commercials*

WALTER CASTLE, ASC, Commercials*

PEVERELL MARLEY, ASC, Commercials,* "Rachel Cade" with Peter Finch and Angie Dickinson. Gordon Douglas, director.

HAL MOHR, ASC, Commercials*

LUCIEN BALLARD, ASC, "The Life and Death of Legs Diamond" (United States Pictures) with Ray Danton and Karen Steele. Budd Boetticher, director.

JACK HILDYARD, "The Sundowners" (Technicolor; shooting in Australia) with Deborah Kerr and Robert Mitchum. Fred Zinnemann, director.

MARK DAVIS, ASC, Commercials*.

HARRY STRADLING, ASC, "The Crowded Sky" (Technicolor) with Dana Andrews and Rhonda Fleming. Joseph Pevney, director.

HAROLD STINE, ASC, EDWIN DUPAR, ASC, RAY FERNSTROM, ASC "Sugarfoot"* with Will Hutchins.

RAY FERNSTROM, ASC, EDWIN, ASC, "Brocco"* with Ty Hardin.

WARREN LYNCH, "Lawman"* with John Russell.

HAROLD STINE, ASC, WESLEY ANDERSON, "77 Sunset Strip" with Efrem Zimbalist, Jr.

JACK MACKENZIE, ASC, RICHARD RAWLINGS, ROGER SHEARMAN, "Cheyenne" with Clint Walker.

HAROLD STINE, ASC, BURT GLENNON, "Maverick"* (with Jamie Garner).

RALPH WOOLSEY, ASC, WARREN LYNCH, "Colt 45"* with Wayde Preston.

Continued on Page 771

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ZIV STUDIOS

LLOYD KNECHTEL, ASC, Commercial*.

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If you are a producer or photographer of 16mm industrial, business, training, educational or teaching films, or are engaged in the production of in-plant or research motion pictures, you will find a great deal of pertinent information each month in "The Aperture," workshop publication for 16mm film makers published monthly by Calvin Productions, Inc., Kansas City, Mo.

Also . . . you will want to keep in mind and plan to attend *Workshop 60* sponsored by Calvin and conducted on the Calvin sound stages.

This annual event features examples, demonstrations, lectures and discussions of 16mm motion picture production techniques. The only attendance requirement is an interest in film. There is no cost or obligation.

If you need a letterhead invitation from Calvin to satisfy employer leave requirements in order to attend, write to "Workshop 60," Calvin Productions, Inc., 1105 Truman Road, Kansas City 6, Mo, and company will oblige.

• • •

It is possible to expose Anscochrome and Super Anscochrome, using fluorescent lighting, according to Ansco, by following the filter recommendations below Ansco emphasizes, however, that fluorescent illumination, because of its discontinuous spectrum, is not ideal for color photography; however at times it may be necessary. Because of variations in fluorescent tubes and the fact that Reciprocity Law failure may be a factor, it is not possible to give exact recommendations. The following filter information is offered as a starting point for tests to be made by the individual cinematographer:

Lamp Type	Filters for Tungsten Film	Filters for Daylight Film
Soft white	10R + 30Y	10B + 30C
Standard cool white	40R + 30Y	10B + 10C
Daylight	50R + 50Y	10B
Standard warm white	10R + 20Y	10B + 30C
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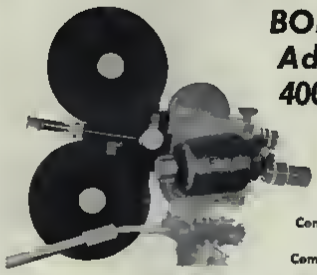

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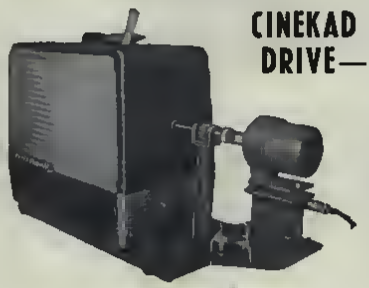

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